approach

OCTOBER 1967 THE NAVAL AVIATION SAFETY REVIEW

PRECISION in Approach

Troubles in the landing pattern leave little time for corrections. Today's tactical jet aircraft have such a broad speed spectrum that pilots must be very careful to be on-speed and on-altitude for safe and efficient approaches to landings. A positive and precise landing approach pays personal and safety dividends.

A major factor in safely landing modern jet aircraft is a precise approach. Every model has techniques worked out in detail by contractor and Navy test pilots. Many sophisticated devices on these operational jets are necessary to achieve maximum velocities coupled with acceptable landing speeds. In the landing approach, each device must be manipulated in the listed sequence for explainable reasons. The order will vary according to the flight mission, some of which are: descent from high altitudes; touch-and-go landings (airfields and carriers); landings to a full stop (airfield and carrier); FCLP operations: CCA or GCA practice; and so on.

Assuming proper fuel management, good landing

Patterns

are set up on the approach (break to touchdown). One of the most important factors is to enter the downwind on specified speed and at an altitude set forth by the airport or carrier. If the speed is too fast, flap and gear extension might be impaired or even damaged. Being off speed and/or altitude can foul up other aircraft in the pattern and interfere with exact compliance to the NATOPS checkoff lists.

With each sequence there is a correct airspeed and angle of attack. Being too fast on touchdown can result in blown tires, overrunning the strip, continuous bolters or waveoffs from the carrier LSO. Being too slow may lead to a stall/spin, landing short of a runway or a carrier ramp strike.

There are, literally, hundreds of reasons why an approach gets out of hand. Some actual accidents/incidents illustrate a few of the peculiarities that may be encountered.

Night Work Requires Extra Care

On a dark horizonless night, an F-8 pilot was about one minute away from his estimated approach time to the carrier. At this time the pilot discovered that his tacan was not operating properly. Upon informing the CCA operator of his situation, he was directed to join on an A-4 which was about to commence the first of a chain of CCAs.

After a somewhat hairy but successful joinup, due to a combination of reduced visibility (an additional hazard to night flying) and aircraft model differences, the section settled down three miles from glide slope interception. At this time, the CCA controller directed the *Skyhawk* to go around in the waveoff pattern and for the *Crusader* to continue his approach. By the time the F-8 pilot had performed his landing check, he was closer to the carrier than normal. Consequently, upon reaching the point where he was to commence final glide slope descent, he was 20 kts fast. Extra concentration on the gages got the pilot on-glide-slope and on-speed just in time to receive his "go visual" instruction from the CCA operator. Expecting to instantly see the meatball and the normal deck lights on the carrier, the pilot was shocked to see only a few lights in an unrecognizable pattern, and the proximity of their position indicated he was about to crash into the ocean. Continued

The second approach was good.

To the pilot, it seemed like several long seconds until the *Crusader* responded to his almost panicked movements in executing a full power waveoff. Another second later, the radio banged his eardrums with the LSO shouting, "waveoff, waveoff, waveoff." The next trip around the pilot got everything back on the NATOPS schedule and got aboard safely.

This near-accident almost occurred because the pilot did not get squared away according to the CCA schedule. Adding to his situation was a breakdown of communications within the carrier. The CCA controller *assumed* that the deck was ready to receive aircraft. Someone erred in not passing the word, or the controller would have known that the mirror and deck lights were off. The placement of the lights as seen by the pilot were on the fantail and superstructure. The real confusion as to their identity was attributed to the fact that the pilot was lower than the flight deck.

High Sink Rate Equals Ramp Strike

A flight of four *Skyhawks* had completed their tactics hop and had returned to the carrier. Number 3 in the pattern was noted to be long in the groove and slightly high by the LSO. Consideration was given to waving the pilot off but as he approached closer it was decided that he was on-glide-slope, on-speed and lined up within limits.

When approximately 800′ from the ramp, a small left wing down turn was noted along with a slight easing down of the nose position. Immediately, an increased sink rate was detected by the LSO who, less than two seconds later, radioed to the *Skyhawk* pilot to add power. As the sink rate increased, the LSO made two frantic power calls and then actuated the waveoff lights. An instant later, the aircraft hit the ramp with the speed brakes still extended.

Upon contact near the bottom of the rounddown, the port wing snapped off at the root, and fuel flamed from the opening. Sliding up the deck, the torch rolled to the left and was almost inverted as it went over the port side at the fresnel lens location, smashing it enroute. The wreckage quickly sank and the pilot was not observed to eject although the seat was seen to be out of the wreckage a minute later. The pilot was not recovered.

It was later calculated that the *Skyhawk* weighed about 14,400 pounds upon contact which was within the limits as tabulated in the NATOPS handbook for carrier landings. The approach started at 145 kts and slowly decelerated to 128 kts upon impact. There was 38 kts of wind over the deck which created an abnormal amount of burble aft of the ship. This combination may have upset the pilot's habit pattern of landing. Nevertheless, this is an example where trouble was started in the approach, small as the variation might have been.

Many pilots have, no doubt, been caught in similar situations, but were able to get the power back on in time. Just why this pilot failed to add power at the proper time will never be known.

Hills Blank Off the Airport Lights

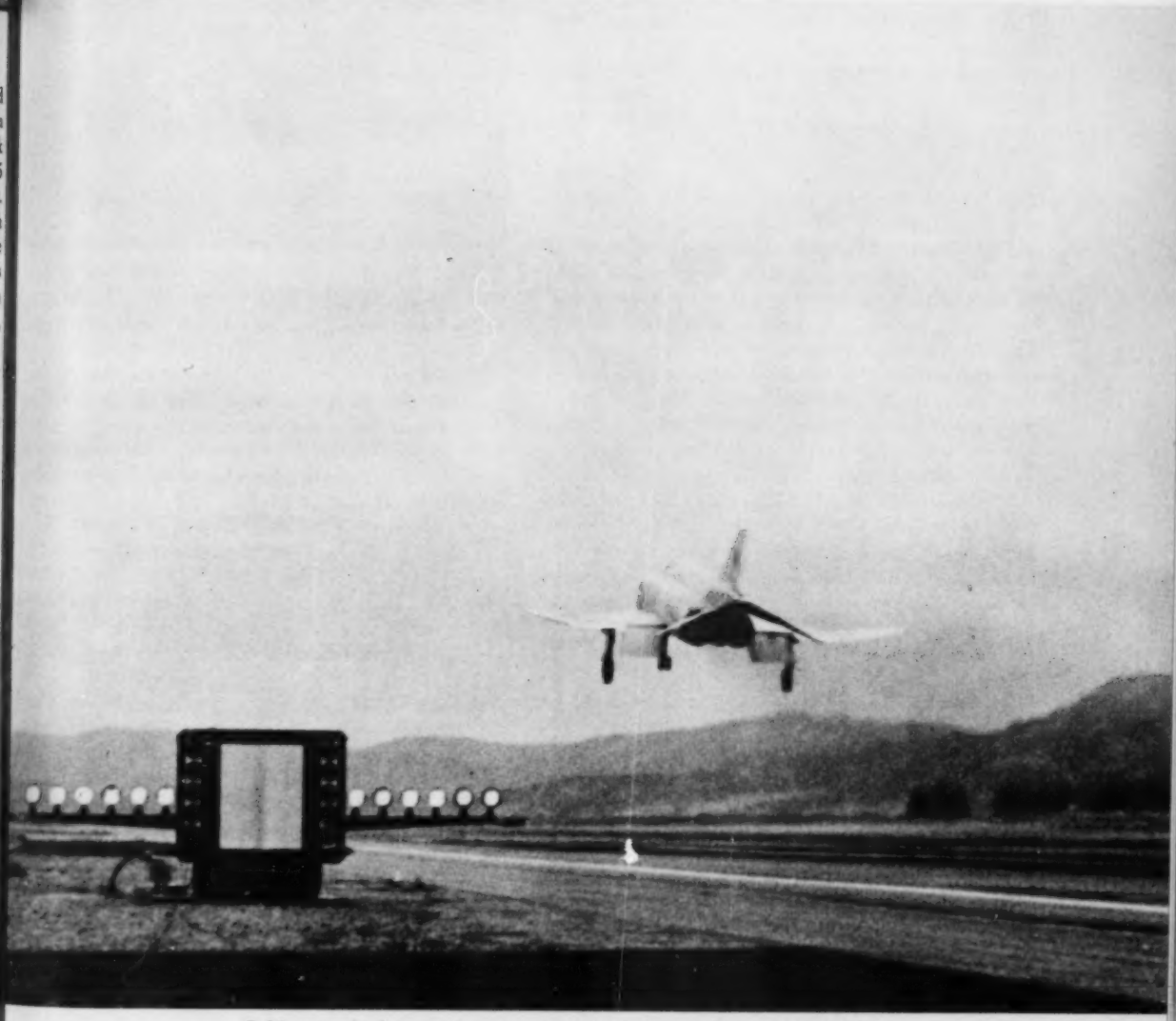
A group of new pilots in an F-4 squadron had satisfactorily completed the scheduled day FCLP period, with a night bounce drill to follow. When darkness had fallen, four *Phantom IIs* took off in quick succession and set up the night pattern. Pilot X reported, "180, gear down and locked." Pilot Y closing the circuit behind noted that Pilot X appeared to be at the same altitude and their interval looked proper at the time of the transmission. Continuing downwind, however, Pilot Y reached the position where he thought he should commence his base leg but he could not see pilot X's aircraft running lights on his port beam.

The F-4 ahead of Pilot Y in the pattern should have been commencing final approach to the runway. Pilot Y delayed turning because he had observed an aircraft tail light at what appeared to be an extended interval almost directly ahead. The two abnormalities caused him to check with the LSO for information on Pilot X's position. Before the LSO could answer, Pilot X transmitted that he was deep at the 90-degree position, thus confirming Pilot Y's observation.

Somewhat confused by the transmissions, the LSO strained his eyes and soon located Pilot X's lights at a very extended 45-degree position. He then radioed, "aircraft approaching the groove, you are low." A few seconds later the *Phantom II* crashed.

The FCLP final approach was over hills some 335′ higher than the elevation of the runway. The pilots were considered to have been very familiar with the terrain hazard, having flown over the area for a considerable amount of recent day bounce practice. They were briefed not to commence the final approach descent below 1000′ until the lights of the field were clearly in sight. Nevertheless, the ill-fated F-4 struck an 835′ hill 15′ below its crest.

Since the crew did not survive, the exact cause of the accident must be considered as undetermined. Circumstantially, however, it appears that the pilot deviated from the precisely briefed pattern in both distance and altitude. Without the presence of the hills, the accident might not have occurred. But it



Field carrier landing practice—an opportunity to keep in the precision habit.

did happen and another tragic example has been demonstrated concerning the importance of exact approaches and attention to briefed detail.

Angle-of-Attack Instrument Malfunction

A recent training command fatal accident happened wherein the angle-of-attack instrument was suspected of giving erroneous readings which were undetected by the student pilot.

A group of NavCads were in the pattern for their second scheduled night FCLP bounce period. One TF-9J pilot was observed low and wide on the downwind leg. At this time the pilot transmitted that the aircraft's port access door in the nose had come loose and he would make a full stop on the next landing. Immediately thereafter the LSO observed the lights on the *Cougar* climbing higher than the dictated pattern and he radioed a word of caution to the student. The aircraft then commenced a rapid rate of descent with the green (slow) angle-of-attack approach light showing all the way down to impact. The LSO called for ejection several times but the pilot did not respond and perished in the wreckage.

Although the accident was labeled as having occurred essentially of an undetermined cause, there is a strong suspicion that (as it did in a similar daytime incident previous to this) the open nose access door caused erroneous low angle-of-attack increment readings. The instrument's probe is located near the door which, when it is open, is known to disturb the normal air flow over the slots. Consequently, a stall condition rapidly developed before the pilot detected it and the beginning of a spin used up the meager altitude that remained.

For many years airspeed indicators were the pilot's main instrument for approaches and landings. Now, the angle-of-attack indicator has become the primary instrument relegating the airspeed indicator to a secondary role in naval tactical jets. Most flight instruments can and must be cross-checked against others normally as well as in the case of suspected failure. This holds true for the airspeed and angle-of-attack. Unfortunately, under certain circumstances, there is little time to detect and correct off-speed approaches and landings so that wise pilots will continuously scan all related instruments (the attitude gyro has related movements) during the critical phase of getting safely back to earth.

The angle-of-attack air flow was disturbed.

In the daytime, the pilot might have been able to ascertain by ground references that he had let the aircraft get dangerously slow due to an abnormally high angle-of-attack. Unfortunately, there were little or no reliable outside references to observe for quick orientation at night.

Good Approaches Are a Workout

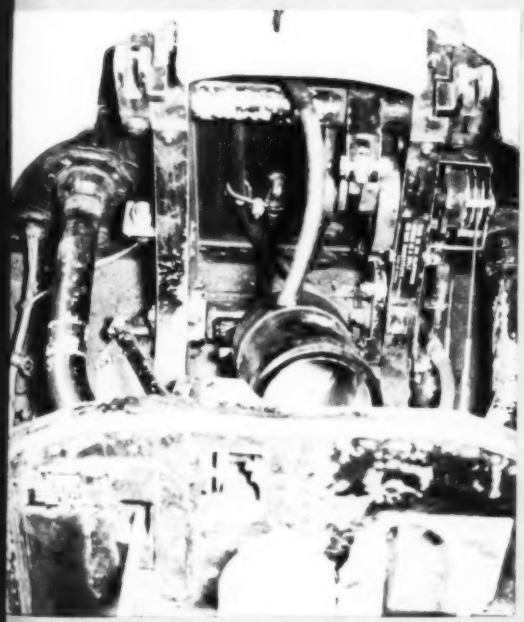
There are many aircraft malfunctions which can set the stage for trouble. The result can be off-speed, off angle-of-attack and off-altitude approaches which in turn lead to landing difficulties. Pilots should be continually cross-checking flight instruments during the approach. Depending upon the type malfunction, bad approaches/landings can not always be prevented by the pilot. There are, however, many instances where equipment trouble occurs and it is such that a good approach/landing can be made regardless. This is especially true if the pilot is experienced, exceptionally competent and/or fully realizes the nature of the discrepancy. Unfortunately, some pilots allow controllable malfunctions to excite them to such an extent that a bad approach/landing is assured.

Fuel permitting, and with an understanding of the trouble, a waveoff and new approach is often the best cure. It gives a pilot time to get-a-hold of himself regardless of the cause, (equipment malfunction or his own lack of attention).

Old Airplanes + Young Crewman — Caution = Damage and Injury

. . . equals damage.

An unfamiliar cockpit. . .



AN A-4A had been hauled out of mothballs and flown to NARF for PAR. Upon arrival at the destination an assigned line crewman was attempting to insert the canopy pneumatic bungee safety lock. It was an older type with the latch release at the base of the bungee cylinder supported by double retaining straps. Unfortunately, few of the men were familiar with it. Standing on the entrance ladder, the man had the lock in his left hand while trying to insert it into the proper position. Suddenly, the bungee fired with such force that it went through the canopy and another 150′.

The crewman's sound-attenuation ear 'muffs were pulled from his head by the blast and carried 30′. The man received a 5″ laceration across his forehead and the thumb of his left hand was broken.

This hazardous design has been corrected in later models of the bungee by putting the latch release at the top of the bungee cylinder where it can easily be seen for placement of the safety pin.

Responsible personnel must anticipate potentially dangerous situations such as this when older aircraft are brought back into commission.

ON THE GLIDE SLOPE

The DD-175 illustrated denotes an IFR Flight Plan for a single TA-4F from NAS Lemoore to Kirtland AFB with a practice penetration and missed approach at George AFB.

1. *Question*: What publication contains the proper procedures for filling out the DD-175?

Answer: Sec. II FLIP Planning Document. Pilot Procedures Section.

2. *Question*: What may be used as the radio call for Navy/Marine fleet and training command aircraft?

Answer: Navy/Marine plus last five digits of the aircraft bureau number; or assigned letters or number/letter (tail marking) plus not less than two or more than four digits.

3. *Question*: If a radar departure is desired, how is it entered on the DD-175?

Answer: Write "Request Radar Departure" in SID name and number block. It is also advisable to put a specific point in the "to" block, along the route of flight. Do not put a SID in the Standard Instrument Departure block and then "Request Radar Departure" in the remarks section. This would result in a clearance for a SID.

4. *Question*: Upon receipt of flight clearance at NAS Lemoore, is the clearance normally expected to include the practice approach and missed approach at George AFB?

Answer: No. Clearance for practice approaches and missed approaches must be obtained from center prior to arrival at the Initial Approach Fix. In the event of experiencing lost communications prior to receiving practice approach clearance, simply treat the Initial Approach Fix as an enroute fix and continue via last clearance at last assigned altitude or MEA, whichever is higher.

5. *Question*: Is the type of penetration desired at the destination airfield listed in the "Remarks" section?

Answer: No. The last fix listed in the route of flight line is always the Initial Approach Fix for the type of approach desired at the destination airfield. This automatically denotes the type of published approach desired. If a radar descent is desired, it is advisable to file to an Initial Approach Fix to cover the routing in case of lost communications. Tacan Initial Approach fixes will be clearly identified by name or location.

Generally, the information contained in the "Remarks" section of the DD-175 does not get passed down the line to the destination Approach Control in sufficient time to be used as a lost communications clearance. The route of flight information will be passed to Center prior to the aircraft transiting the area and the included Initial Approach Fix will indicate the type approach desired.

In the event that two or more approaches to a given field are served by a single Initial Approach Fix, Center will keep all approach patterns cleared in the event of a lost communications approach.

If another type of approach is desired at the destination airfield a request to Approach Control will be sufficient to obtain new clearance.

MILITARY FLIGHT PLAN

AIRCRAFT UNIT OF ASSIGNMENT/HOME STATION: VA127 - NAS LEMOORE

AIRCRAFT SERIAL NO.: 153609

TYPE OF FLIGHT PLAN: ✓ VFR ☐ OVER ☐ IFR

RADIO CALL/TAIL CODE: V53609

AIRCRAFT DESIGNATION: A4/P

ESTIMATED TRUE AIRSPEED: 420

DEPARTURE TIME (Z): PROPOSED 1830 ACTUAL

INITIAL CRUISING ALTITUDE: FL330

POINT OF DEPARTURE: NLC

STANDARD INSTRUMENT DEPARTURE: NAME AND NUMBER: LEMOORE #3

TO: Mc FARLAND

SPD	LVL	ROUTE OF FLIGHT	TO	ETE/SET
✓		BFL, J65 PMD, TRY IAF, HEC, J16 ABQ, MEDIAN KIRTLAND AFB		1+50

REMARKS: ① REQUEST TACAN PENETRATION + GCA TO MISSED APPROACH AT GEORGE AFB. ESTIMATE 0+15 ENROUTE DELAY.

BASE/HONOR CODE: PSGR/CARGO CODE:

WGHT FUEL ON BOARD	DIST TO DESTN	ALTERNATE AID FIELD	ETE TO ALTN	REQUEST CLEARANCE AFTER
3+15	731	CANNON AFB	0+25	

PILOT RATING	SIGNATURE OF PILOT IN COMMAND	SIGNATURE OF APPROVING AUTHORITY	DATE
SPIC		R J Jones	6/19/67

CREW/PASSENGER LIST

DUTY	NAME AND INITIALS	GRADE	SERVICE NO.	ORGANIZATION AND LOCATION
PILOT IN COMMAND	JONES, R. J.	LCDR.	626490	VA127 - NAS LEMOORE
C/P	ROBINSON, C. L.	LTJG.	628326	VA56 - NAS LEMOORE

PILOTS PREFLIGHT CHECKLIST

✓ NOTICES	✓ AIRSPACE RESTRICTIONS	AIRCRAFT/DESTINATION NAV AIDS
✓ WEATHER AND WINDS	✓ CHARTS, PUBLICATIONS, MAPS	DD Form 1652 (Weight and Balance Clearance Form F)

6. *Question*: Does the ETE of 1+50 reflect the time for executing the practice approach and missed approach to George AFB?

Answer: No. The ETE on an IFR Flight Plan is the time from takeoff to the fix serving the destination airfield, exclusive of enroute delays, time for practice approaches, etc.

7. *Question*: Why is the terminology Tacan Only no longer listed in the remarks section of the DD-175?

Answer: The new TD Codes (following aircraft designation) take into account Tacan Only aircraft with the letters/M,/N,/P. This information is no longer required in the remarks section.

8. *Question*: Does the date on the DD-175 correspond to GMT or local time?

Answer: Local time. The proposed departure is GMT, but the date appearing on the DD-175 is based on local time.

9. *Question*: Does TA-4F 153609 have sufficient fuel on board to meet the OpNav Fuel Reserve requirement?

Answer: Yes. OpNav requires sufficient fuel on board to fly from takeoff point to preplanned altitude over destination or to the letdown fix serving the destination and thence to alternate, if one is required, plus 10 percent. In no case shall the required fuel reserve at destination or alternate, if one is required, be less than that needed for 20 minutes' flight. The 20 minutes of fuel for jet aircraft is computed at maximum endurance at 10,000′.

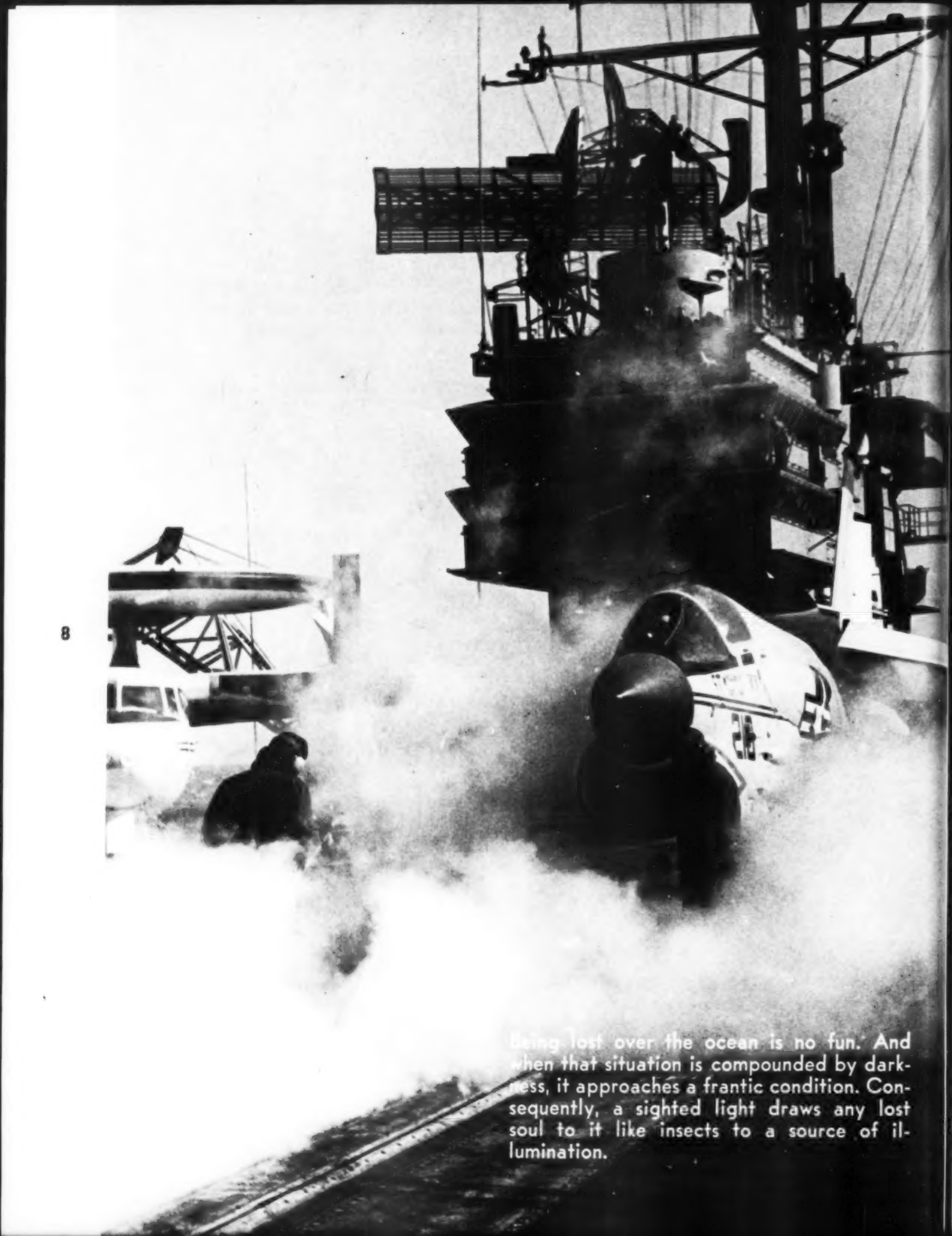
The DD-175 ETE is 1+50, estimated 0+15 delay at George AFB, with an additional 0+25 to the alternate. The addition of 20 minutes of flight would give a sum total of 2+50 fuel required. The total of 3+15 fuel on board is computed taking into account the enroute penetration.

If you have any questions regarding instrument flight procedures, send them to:

Commanding Officer

VA-127

NAS Lemoore, Calif. 93245



Being lost over the ocean is no fun. And when that situation is compounded by darkness, it approaches a frantic condition. Consequently, a sighted light draws any lost soul to it like insects to a source of illumination.

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MISGUIDED BINGO

According to the NATOPS Manual for CVA/CVS, bingo is defined as: "An order to an aircraft to proceed immediately to a divert field. Bearing, distance and destination will be provided." In essence this is the equivalent to the required alternate airport when on an IFR clearance. OpNavInst 3710.7D says jet aircraft ". . . shall carry sufficient fuel . . . to fly from takeoff to destination, or to the approach fix serving destination and thence to an alternate, if required, . . . plus 10 percent. . . In no case shall the planned fuel reserve at destination or alternate . . . be less than that needed for 20 minutes flight. . ."

Recently, some night carrier operations necessitated several bingos for aircraft in the pattern. They all would have been routine bingos except one pilot was caught in a quick sequence of circumstances which helped him crunch a *Crusader* beyond repair.

Routine CCAs

Pilot X was launched from a carrier at 1820 in an F-8C, on a flight for night carrier landing buildups. The launch was originally scheduled for 1730, but due to flight deck respotting and downwind steaming by the ship, the launch was rescheduled for 1800. The weather was high scattered cirrus clouds with 8 miles visibility and remained the same throughout the recovery period. The sea state was Two with swells WNW 3′. The ship was pitching and rolling moderately which caused a high bolter and waveoff rate.

Throughout the recovery period the ship was operating in close proximity to Island Z. The base recovery course was northwesterly and the primary bingo was ALF Island Z. The unusually low boarding rate caused the CCA pattern to become full and placed a heavy load on the CCA controllers who were operating with limited radar coverage. This resulted in the CCA pattern becoming extended both upwind and downwind. At 1834, Pilot X was given a waveoff on his *second approach* and told to continue upwind. At 1846 he reported six miles ahead of the ship with 1400 pounds of fuel remaining. CCA did not acknowledge.

Bingo is Announced

At this time, Pilot X decided to transition to the cruise configuration in preparation for a bingo. At 1847 he heard the carrier tower give another F-8 pilot bingo information to Island Z as 231 degrees, 4 miles.

At about 1848 Pilot X requested bingo information and CCA responded with the same directions it had just given the other *Crusader* pilot, ". . . pigeons 231, 4." Pilot X rogered and further informed the ship that he had 1200 pounds of fuel. Unfortunately, ship calculations were not correct because Pilot X was actually 18 miles NNW of ALF Island Z.

Obediently, Pilot X turned left to a heading of 230 and began a gentle climb from 2000′. Momentarily, the pilot must have relaxed to be so near his destination. Upon seeing no lights close under his nose, however, the beginnings of tension must have commenced. When additional staring into the blackness still revealed nothing, the pilot double-checked his tacan which was set on the channel for the bingo field and it was not registering. Upon transmitting these difficulties to the tower operator of ALF

Island Z, the ground station informed him that the tacan was inoperative.

Lost in Four Minutes

At this time, the ship's tower made a blanket transmission that the bingo field was off their port quarter. ALF Island Z tower picked this up and passed it verbatim by telling Pilot X that the bingo field was, ". . . off your port quarter."

Pilot X came back with a message that he saw nothing and a moment later announced he was on course 270. There seem to be no exact explanation for this change to a west course because a turn in the other direction (port) would have been more feasible. A supposition which seems plausible, however, is that *a turn* was necessary since the pilot surely must have realized that he had traversed many times the original 4 miles and long since passed the field. Four-plus minutes had passed since Pilot X received his 4-mile message wherein he traversed 20-plus miles putting him almost 30 miles west of Island Z.

Everyone Tries to Help

Meanwhile, the ship got some words in edgewise (there were five differently located people on the bingo circuit) to Pilot X that they would vector him to destination if he would put his ". . . IFF on emergency . . . ." Pilot X replied, "squawking emergency, I've got some lights up here. If this isn't . . . (the bingo field) . . . I'm gonna have to make it for the mainland here." The ship's tower came back with information that Island Z was, ". . . on the port quarter, port quarter of . . ." This was intended to re-inform Pilot X that the bingo field was on his port quarter but in actual fact the distance had stretched out to almost 40 miles westward.

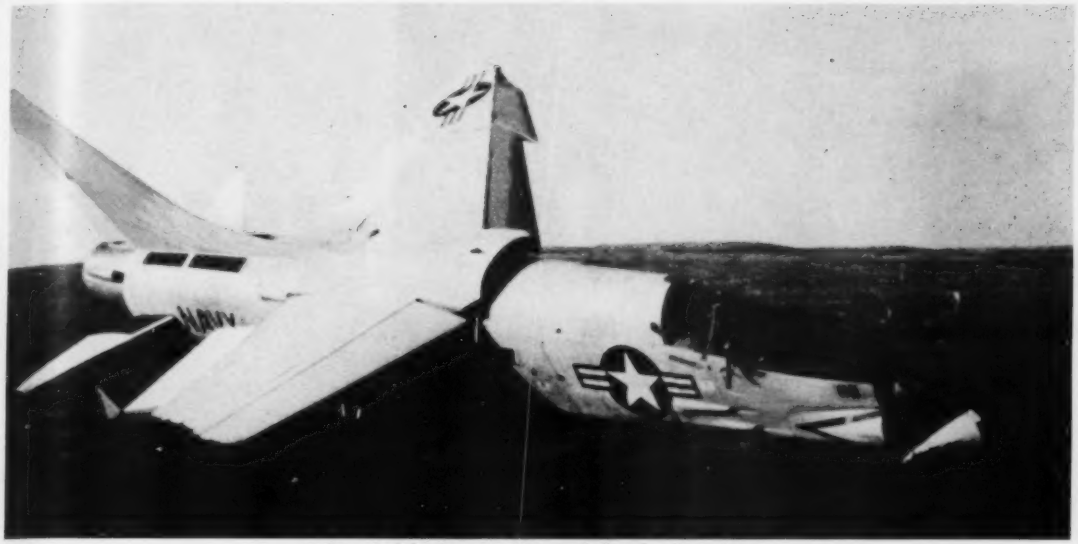
Another airborne *Crusader* pilot tried to help by asking the lost pilot to, "Give me a short count . . ." so he could obtain a UHF bearing on Pilot X. Cooperation was sidetracked, however, because he was transfixed with matching the lights to the bingo field. "Roger, I think I've got it now . . . It's coming up right here . . . Roger, would you turn off the runway lights . . . (Island Z) . . . Just blink them one time." Three airborne *Crusaders*, a ship and a ground station were filling the air with almost continuous chatter so that Pilot X had to make a second request for blinking the runway lights. Then he got a quick answer which seems to indicate that the first request was being fulfilled, "Roger, we're flashing 'em sir," from Island Z.

At this point Pilot X made a decision which might have straightened everything out if he had gone through with it because it very likely would have brought him back over Island Z. He transmitted, ". . . turning towards the mainland and I'm gonna be heading for . . . (a mainland homebase) . . . and my state is now 900 pounds." This plan was dissolved by the following series of transmission excerpts: "Negative . . . (Pilot X) . . . this is . . . (ship's tower) . . . put your IFF on emergency. We will vector you into the runway at . . . (Island Z) . . . over." Pilot X answered, "Roger, I've been squawking emergency for about 3 minutes.". "(Ship's tower to Pilot X), . . do you have . . . ship's tower . . . in sight, over?" Pilot X answered, ". . . negative." Two more interchanges led the ship's tower to ask "Do you have . . . (me) . . . on your tacan or visually, over?" Pilot X answered with a series of negatives and then another *Crusader* pilot called Pilot X, ". . . do you have . . . (Island Z) . . . in sight." The same pilot did not wait for an obvious negative answer as he quickly added, " . . give me a long count and I'll go to my ADF to see if I can find you . . I have a bogey about 5 miles from me." Then the third airborne *Crusader* pilot got into the act with, "All aircraft stay off this frequency for a minute . . . (Pilot X) . . . give me a short count please." Pilot X quickly responded with, ". . . short count follows, 1,2,3,4,5,4,3,2,1, short count out . . . (Island Z) turn off your tower one time . . . rotating beacon one time." The bingo field tower immediately answered the somewhat confusing request to the effect that they were unable to turn off the rotating beacon. Then the *Crusader* pilot who asked for the count came back on the air, ". . . (Pilot X) . . . this is . . . (his call sign) . . . you appear to be bearing directly west of . . . (Island Z) . . . just pick up a heading of 090."

A Bird in the Hand Is Worth Two in the Bush

Ignoring the suggested course, nearly a minute passed before Pilot X spoke again. "I've got a field down here. I don't what it is . . . Going down to take a look at it and, a, state is now 800 pounds." More conversation ensued between Island Z tower and Pilot X about flashing the lights but not seeing them. After a few more interchanges, Pilot X announced, "Okay, I'm turning on the base downwind for a landing . . ."

While Pilot X prepared to land, he knew not where, a mainland naval air station about 60 miles to the north made some transmissions, one of which was that their electronic detection means indicated the aircraft in distress was in the vicinity of Island Y. Pilot X picked up the message and answered, "Is . . . (Island Y) . . . tower up?" he received an immediate negative. With his location finally pin-



A downwind landing was too much for the *Crusader*.

pointed, Pilot X surely realized he was a good 45 miles west of the field he was supposed to have used for the bingo. This information and his low fuel state convinced Pilot X that he must land in spite of no tower-landing-information-assistance.

A Good Approach . . . Downwind

Pilot X guided his lightened *Crusader* to a right-hand approach to runway 12 which unfortunately, was downwind to the tune of 15 kts. There was a visible *tetrahedron but only 10 of its normal 35 lights were illuminated* and this turned out to be no help to a pilot in a hurry to get down. The APC was purposely engaged by the pilot for its possible landing assistance. With the hook lowered, just in case pendants were on the runway, the pilot touched down on speed (135 kts) about 1000′ long. The F-8 bounced back into the air as could be expected with the APC on. Back on the deck at about the 1500′ marker, the pilot began to think it might be a safe rollout. He received further encouragement when he felt the hook grab something and the aircraft rapidly decelerated. The sudden bit of hope was quickly dispelled as the E-5-1 pendant parted. Engagement had been on the centerline but going in the wrong direction. Sometime during this early phase of the landing rollout the tires were blown. Pilot X was then unable to control the direction of the rollout, even with nose gear steering. The aircraft began a swerve to port while sliding sideways to starboard departing the pavement on a heading of about 90 degrees relative to runway centerline. The starboard MLG dug into the loose earth, then the *Crusader* commenced a right roll about the longitudinal axis using the starboard wing tip and nose as pivot points, breaking off the starboard outer wing panel. The aircraft continued corkscrewing, scraped the port wing tip after 270 degrees of roll, and came to rest on the right wing-fold area, right MLG, and nose section. The engine flamed out soon after the aircraft left the runway because of dirt and debris scooped into the intake duct. Pilot X evacuated the aircraft after it came to rest and was not injured. No fire resulted.

This accident points out a number of mistakes. Once Pilot X commenced his bingo, he was erroneously vectored almost at right angles to the correct course for Island Z thereby nullifying a possibility of sighting the airfield lights in the mere 8 miles of visibility. The preflight briefing did not mention the fact that the tacan on Island Z was inoperative although the information was passed to the ready room earlier in the day.

Before anyone realized the seriousness of the situation, Pilot X had sighted some lights. His low fuel state and nebulous location over the ocean made him want to believe that the lights were his bingo field and it quickly gravitated into "any old port in a storm." In that the tower was unmanned and the wind direction indicator poorly lighted, it was a 50/50 chance that the far-from-relaxed pilot would land downwind.

Inflight R

Air refueling has become a way of *life* for modern combat jet aircraft. One would think it could be a simple procedure of transferring fuel from tanker to customer. Hose whip has been cured by drogue control devices. High speeds compound the problems and there is a limit to slow speeds because the aircraft being refueled rapidly increases its weight. If too slow, the added load could lead to a stall/spin condition.

Present jet aircraft have fuel capacities which almost equal half their dry weight. As this fuel is consumed, it must be transferred between tanks so as to keep the center of gravity within precalculated limits at all times. When conducting air refueling, this balance must be maintained in a scheduled sequence in a semireverse order.

A recent F-8E air refueling accident is a good example of just how really complex it has become to transfer the JP. Pertinent excerpts from the pilot's report clearly tell the story.

> My preflight, start and post start checks were normal, including operation of the AR system which I checked while taxiing to the runway.
>
> Individual takeoffs were made and the flight proceeded as briefed. The only unusual event prior to the accident occurred after being airborne for about one and one-half hours at FL 390, IMN .88. I felt two sharp thumps shortly after I secured my radar. All instruments checked normal and I attributed the thumps to the radar hydraulic system.
>
> My fuel transferred normally throughout the flight with my main cell registering a constant 2900 lbs. The "turn pump off" light came on steady at about 3400 lbs. transfer fuel remaining.
>
> The flight joined the KC-130 at 0945. The first two *Crusaders* plugged in and refueled without incident. I plugged in at about 1005 without incident with 1500 lbs. remaining in the main cell and I believe the transfer cells were empty. Fuel flow commenced from the tanker with both main and transfer levels building up. I noted that the main cell built up to 3500 lbs. with the transfer indicating about 1800-2000 lbs. At about this time WT-2 radioed that dash-3 was venting fuel overboard through the vent mast. I continued refueling because my flight call sign was 'dash 2.' About 30 seconds later WT-2 radioed again correcting the call sign and informed me that there was a heavy stream of fuel coming out of my vent mast. At about the same time I noted 3500 lbs. in the main cell and 4500 lbs. in the transfer cell, so I prepared to back out and disconnect.
>
> At this time I felt a sharp thump from the aft part of my aircraft and simultaneously ex-

Refueling Overdose

Photo of stricken aircraft showing wing fuel dump and tail fire.

perienced a generator failure. My first thought was that someone had run into the tail of my aircraft. I immediately recycled my generator and checked my instruments.

The generator would not reset and I saw my RPM decreasing. Simultaneously I disconnected from the tanker and deployed my RAT, and retarded throttle to idle. At the same time I felt strong vibrations from the aft fuselage which tended to confirm my thought about a collision. I turned on the emergency electrical power, retracted my refueling probe and checked my engine instruments and my mirrors. Twenty percent RPM and 200° EGT were noted with no fire warning light. The vibrations became increasingly stronger and all controls began to become unresponsive although I noted 1700 psi in the PC No. 1 system and about 250 KIAS. At this time I heard WT-2 say I was streaming fuel and to dump my wing fuel, which I did. WT-1 said I had a tail pipe fire. My RPM was still at 20% with throttle at idle. I advanced throttle slightly and noted RPM increase to 30% which surprised me since I thought I had flamed out. At about the same time WT-2 asked me if I had a fire warning light and told me to shut down my engine. I shut down and replied that I had no fire warning light. As I said that, my fire warning light came ON. By this time the aircraft was nearly uncontrollable and vibrations were severe. In a 10-15 degrees nose-down 15-degree right turn I prepared to eject. I removed my knee board, locked my harness and pulled the face curtain. As I was pulling the face curtain I saw I was passing through 11,000 ft on the altimeter. Bailout was routine and the aircraft crashed in the ocean.

All of the events from the generator failure to the ejection occurred in what seemed like less than a minute.

The primary cause of this accident was attributed to failure of the main fuel cell pressure shut-off valve, which allowed the main fuel cell to overfill and rupture. The accident instigated additional ground preflight checks in order to prevent recurrences in the future.

The flight participants handled the situation with cool precision which contributed to the safe recovery of the uninjured pilot.

Short Snorts

Lessons are not given, they are taken.

— Cesare Pavese

Freak Bolter

Night CCAs were in progress. One F-4B went slightly high on final and the pilot boltered. As the *Phantom II* continued up the angle deck, the tail hook point hit the edge of the starboard-most athwartships runway light forward (just short of the No. 2 elevator). The guard/cover plate separated and the internal mounting casting assembly casing was shattered. Metal chunks were thrown toward the taxi area to the right and forward of the No. 2 elevator striking the assistant flight deck officer in the right thigh. Other metal pieces were found scattered about the flight deck.

On the next pass, the aircraft landed without further incident.

Subsequent investigation revealed that the cover plate had been missing five of the normal 10 securing screws. Upon inspecting other flight deck lighting covers, it was discovered that many screws were missing, probably due to the constant ship's vibrations. As a result, daily inspections have been intensified to ensure the firm security of the very necessary deck lights.

Deck lights are necessary . . .

. . . but they must be firmly secured.

Spread Wings In a Folded Spot

Upon completing a long cross-country, an S-2E was being maneuvered, wings still spread, into what appeared to be the proper place to park. Unfortunately, there were no taxi directors in sight at this unfamiliar location. The pilot *presupposed* the co-pilot would continue the wingfold actuation after he started the sequence by unlocking the wingfold T-handle. The copilot, however, seeing the pilot commence the wingfolding process *assumed* that he would complete the job. Immediately after pulling the T-handle, the pilot became engrossed in fitting his *Tracker* in between two others.

The end result was a bad fit. The spread wing tips put dents into the elevators of two other *Trackers* and all three aircraft were out of action for a few days while various components were replaced.

The long cross-country from a distant base contributed, no doubt, to the pilot's anxiety to secure the aircraft. Unfortunately, it ended 30′ short of the proper destination vividly pointing out that a flight

Slashed elevators ground airplanes.

is not complete until the airplane is chocked and the engines secured. Moreover, with crewmen aboard, pilots should let one out to act as taxi director in the absence of local help.

Controls Curtailed by Ice

An F-8D had been parked in light rain two hours before takeoff. Ten minutes after reaching FL 380, the *Crusader* pilot experienced a heavy binding of the longitudinal controls. Utilizing the trim system for longitudinal control, the pilot thought the situation called for a descent toward home. After about five minutes at 5000′, normal movement of the flight controls returned.

Checks were made after a routine landing which revealed ice had caused the control restriction. Water, from the rain before takeoff, had collected in the underwing bay against the bulkhead at fuselage station 357. Since the freezing level for that day had been at 8000′, it was concluded that the rainwater had frozen around the idler assembly causing the binding of the longitudinal control. The water had entered the underwing cavity through a broken underwing bay seal.

As a result of this incident, the unit involved recommends all F-8 aircraft be periodically inspected for broken underwing bay seals. The combination of precipitation and flying within the freezing level is a daily occurrence for all jets.

Treetop Scrape

An SP-2E got airborne before dawn in VFR weather, but was quickly engulfed in IFR conditions. Consequently, the pilot made a turn hoping to get back in the clear. He radioed for radar assistance then orbited over the water at 1000′. Upon receiving a radar vector, the turn was stopped and a climb initiated. At 1260′, the left side of the *Neptune* dragged through treetops enshrouded in fog. Fortune was with the crew as a hard pullup returned them to unobstructed air. Inflight checks revealed minor damage to the port tip tank, jet engine nacelle and horizontal stabilizer.

After a safe landing, a close check on the area map revealed land rising almost to 2000′ at the point where the treetop contact occurred. Pilots must always double check altitude minimums in operating areas. Nature often extracts the extreme penalty for unplanned earth/aircraft contact.

Tree damage to the tip tank.

Damage to gear door.

An Unusual Emergency Arrestment

Things seemed normal when the F-8D pilot taxied out for takeoff. He carefully went over his checkoff list, and after receiving AFB tower clearance, applied full throttle. Just prior to rotation speed, the pilot thought he felt a main mount tire blow so he elected to abort the takeoff. He transmitted his intentions to the tower operator who reacted quickly by raising the BAK-9 modified arresting gear. Unfortunately, the inertia generated by the cable raising was aggravated by the nose wheel running over it. The induced whipping action allowed the cable to swing over the starboard wheel thereby negating any further action by the hook. Regardless of the unorthodox arrestment, the aircraft was brought to a normal stop on the runway.

Further checking revealed that the port main tire had blown as the pilot suspected. It was estimated that the *Crusader* was brought to a normal straight-ahead stop because the flat tire on the port side balanced out the asymmetric force of the cable against the starboard landing gear. After replacement of the landing gear doors and the port tire, the aircraft was UP again.

An ILS for Carrier/SATS Approaches

AN/SPN-41 Aircraft Approach Control System (C-SCAN)

A Different Approach

By Thomas S. Momiyama
Naval Air Test Center

An ILS-type landing aid, much like the commercial aviation instrument landing system but relatively inexpensive and compact, has been developed for approaches to aircraft carriers and Short Air Field for Tactical Support (SATS) facilities. The AN/SPN-41 aircraft approach control system, commercially named C-Scan, provides the pilot with a cockpit display of glide slope and line-up information during the final approach. The system has been tested since May 1966 at the Naval Air Test Center and during two sea trials aboard AMERICA (CVA-66). An operational evaluation by a fleet squadron and subsequent implementation in the fleet are planned.

Approaches begin farther out and at higher altitudes than are now possible.

The long range capability of this ILS enables the pilot to commence the final landing descent at 2500 to 5000′, which is higher and therefore safer than the present hazardous "tip-over" altitude of 600 to 1200′. The "Spin 41" usable range extends beyond 10 miles, a distance which is greater than any obtainable with existing carrier precision approach radars such as the AN/SPN-35 and AN/SPN-10/-42. Usable Spin 41 signals have been received repeatedly at 30 to 50 miles; however, intercept angles become increasingly critical with the greater range due to the directional characteristics of the airborne antenna. Although holding the final glide slope from these long ranges would be operationally impractical, the azimuth indications could be used to orient the penetration at whatever descent rate the pilot chooses. After the final glide path interception at a safe altitude, the transition to visual landing aids is made with a minimum of pilot effort in last minute corrections. If the Spin 41 needle indications are followed closely, the aircraft will be positioned on the Fresnel Lens Optical Landing System (FLOLS) glide slope and on the centerline of the angled deck. In VFR conditions when the FLOLS is acquired beyond the range at which the meatball movement becomes discernible to the naked eye, the cross-pointer indication aids the pilot in centering the meatball. Simulated instrument approaches nearly to touchdown have been

Transition to the FLOLS glide slope is made with a minimum of pilot effort.

flown on the SPN-41 and weather minimums of 200′ ceilings and ½ mile of visibility appear to be reasonable with this aid.

The ILS enables the pilot to hold the correct flight path both in elevation and azimuth with much higher accuracy than does the currently used talkdown system. The real time flight path error indications by the glide slope and localizer needles provide instantaneous and continuous information. The inherent lag of the talkdown system due to the ground controller being in the loop, is eliminated. The pilot now becomes his own controller and is independent of the ground controller's human error. By being able to monitor the flight path display continuously, the pilot receives not only his error signals but also his error trend (or rate) information which contributes significantly to the great accuracy of this approach.

The ILS can be utilized interchangeably with the talkdown system. The approach profile and pilot techniques are not substantially changed when using an ILS, thus requiring no extensive training or familiarization period for the pilot. In fact, the talkdown system is an ideal ground monitor for the pilot-controlled ILS approach. Congestion of ship's communications is reduced significantly by use of ILS as a primary approach aid.

A simple and relatively inexpensive ILS such as AN/SPN-41 provides an excellent adverse weather capability for smaller aircraft carriers and advanced airfields which are not equipped with sophisticated electronic approach aids such as the All-weather Carrier Landing System (ACLS). An ILS receiver can be more readily incorporated in current operational aircraft than can an ACLS Mode 1 (automatic) capability.

The AN/SPN-41 system consists of two shipboard/airfield transmitters, an airborne receiver/decoder, and a cockpit indicator. The 2KW peak power transmitters located near the landing area scan coded Ku band microwave signals in the aircraft approach zone. The airborne unit receives and decodes the signals and presents them as "fly up/down" and "fly left/right" indications on an existing cross-pointer localizer and glide slope indicator such as ID-249 or AJB-3 AD1. Total coverage of approach information is from 0° to 10° above the horizon for glide path indications and ±10° from the landing area centerline in azimuth. The airborne antenna installation does not permit omni-directional reception capability; the centerline intercept angle must be less than 45°. The elevation needle in the cockpit deflects proportionally ±65° from the glide slope (approximately the same coverage as that of FLOLS). The azimuth needle deflects proportionally ±3° from the landing area centerline. The elevation and azimuth transmitter antennas are mounted and stabilized separately; stabilization data are derived from the ship's Mk-19 gyro. Test receiver installations to date have been made in two F-8s and one H-34. The receiver installation in aircraft must be tailored to each aircraft depending on space available. The

Fig. 1. AN/SPN-41 Airborne Receiver/Decoder

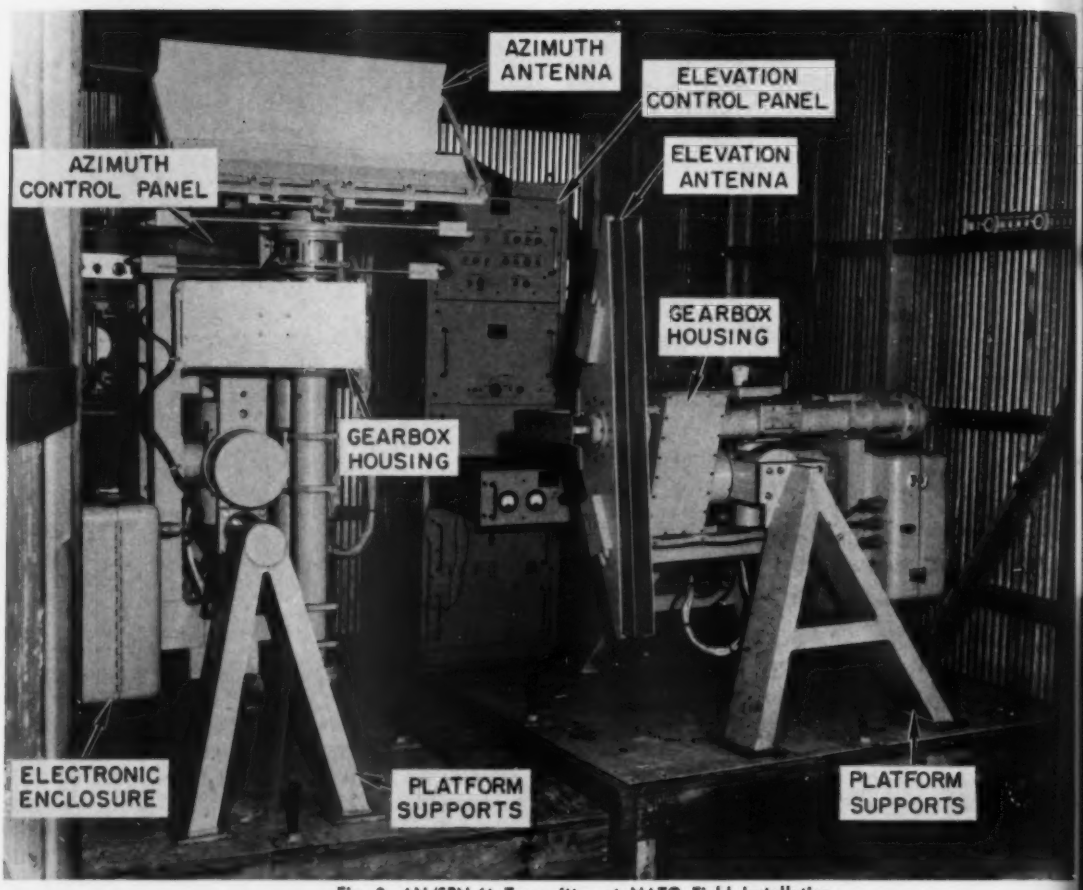


Fig. 2. AN/SPN-41 Transmitter at NATC Field Installation.

receiver/decoder shown in Figure 1 measures 10½" X 4⅜" X 7½" and weighs 12 lbs. If an installation space/location problem exists the receiver/decoder could be separated into a receiver package and a decoder package. Transmitters, including stabilization mechanisms, are shown in Figure 2.

It should be noted that the AN/SPN-41 is a final approach control aid and not an air traffic control vectoring device. The existing tacan, ASR or Naval Tactical Data System (NTDS) control must be used to vector the aircraft onto the Spin 41 glide path. A typical carrier approach profile utilizing an ILS such as Spin 41 is depicted in Figure 3. Traffic control and initial descent (penetration) are accomplished by the existing tacan, ASR or NTDS control (via data link). Transition to Spin 41 can be made as soon as possible on the final bearing. Instrument final descent is continued on the Spin 41 glide slope and azimuth from approximately 10 to 20 miles; the approach should be monitored by a talk-down PAR. Transition to ACLS Mode 1 automatic approach at 4 to 6 miles can be made when available and required. The transition to FLOLS for precision guidance in the visual final approach is made at ¾ mile or less, if ceiling or visibility so dictates. An optical landing system to supplement the FLOLS usable range, such as Depth of Flash OLS, would extend this transition range to 2 to 3 miles in conditions of good visibility.

The Spin 41 ILS opens a new perspective in the instrument carrier approach. It makes the precision approach capability more precise and in one sweep ties the gap between the traffic control and the visual landing aids. In addition, it provides the much needed independent monitor for an automatic carrier approach. Spin 41 can, in the not too distant future, improve the all-weather capability of carrier operations significantly.

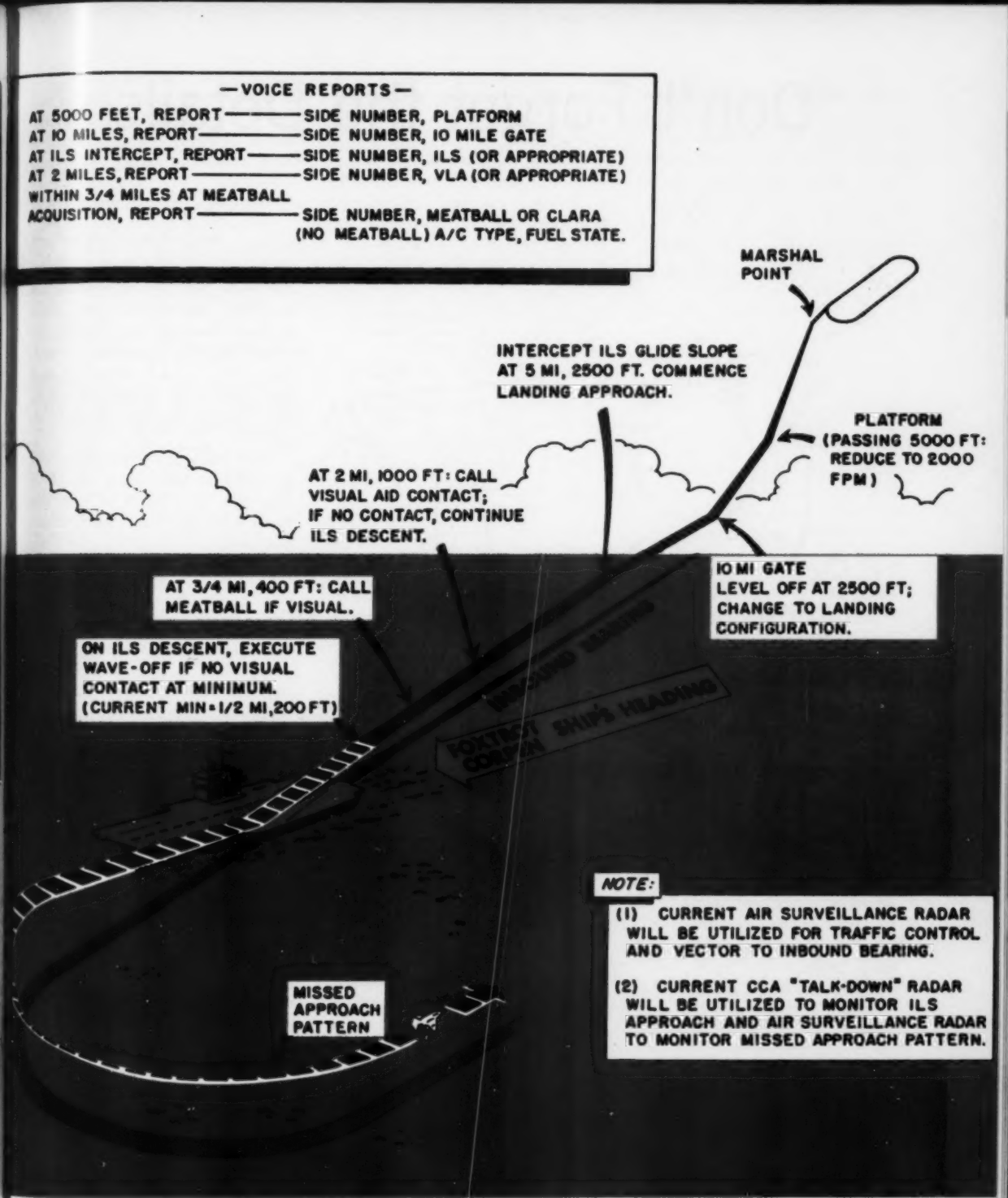
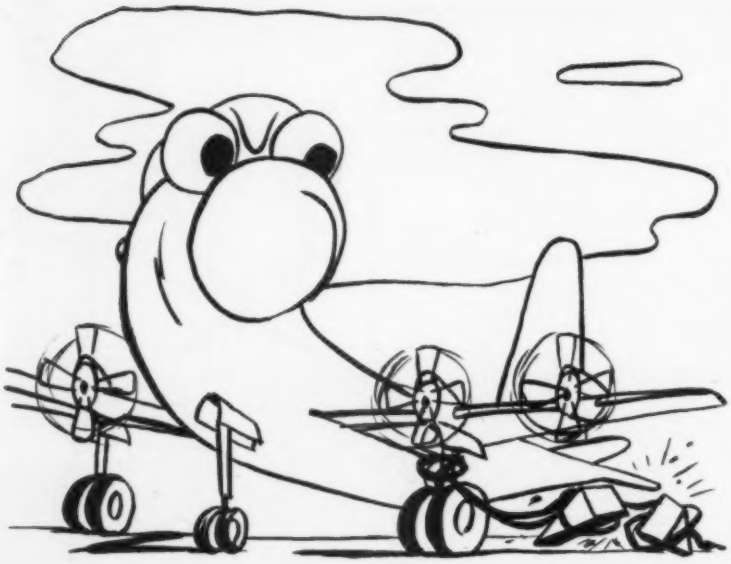


Fig. 3. A typical ILS carrier approach profile.

Don't Forget the Details



A P-3 from Argentia was taxiing in behind us while we were moving another P-3 into the hangar here at Keflavik, when we noticed something dragging from the port main gear of the transient aircraft. Our flight engineer signaled a stop and found a pair of large wooden chocks hung up on the grounding strap of the main mounts.

After removal of the chocks and grounding strap the P-3 taxied out and departed Keflavik.

Had this oversight not been noticed, serious damage could have resulted to the aircraft, possibly jeopardizing its crewmembers. This incident points out the necessity for paying close attention to the little things *before* somebody gets hurt.

ANYMOUSE

As some sage said— take care of the little things, the big things will take care of themselves.

Ordnance Checklists Are Also Important

After a successful Bullpup firing from the centerline rack on an A-4C, the ground crew commenced checking the aircraft for proper Bullpup operation in readiness for a second launch. A two man crew had completed checking three of the four aircraft required.

Both men felt themselves well qualified to administer the check but were in a hurry to meet the flight schedule so the *checklist was not used.*

While one man dearmed the wing stations, the other connected the testers to the aircraft. The technician hooking up the centerline rack tester did not have a screwdriver to gain access to the breeches and assumed the other man would take care of completing the tester hook-up, which required test plugs to be connected to the breech caps.

With each man *assuming* the other had completed his part of the hook-up and the cockpit switches set up for the test, the emergency jettison handle was pulled. To the surprise of the technician on the ground (who had dearmed the wing stations) the centerline ejected the Aero 5A-1 launcher.

Surprisingly, no one was in-

ANYMOUSE

The purpose of Anymouse (anonymous) Reports is to help prevent or overcome dangerous situations. They are submitted by Naval and Marine Corps aviation personnel who have had hazardous or unsafe aviation experiences. As the name indicates these reports need not be signed. Self-mailing forms for writing Anymouse Reports are available in readyrooms and line shacks. All reports are considered for appropriate action.

— REPORT AN INCIDENT, PREVENT AN ACCIDENT —

jured but it must be continuously stressed that:

1. The proper checklist be used no matter what the man's qualifications.

2. There is no time limit for proper safety procedures.

3. Supervision by a qualified supervisor should be available at all times.

Hook Forgetfulness

This A-1 pilot after several on-off briefings, finally manned his aircraft about 2300 on a "hot seat" for night refresher landings aboard USS BOAT. Because this was his first night cat shot and night carrier landing in almost six months, he was a little excited. The cat shot was uneventful and the pilot assumed his marshall position about 15 miles out at 5000′. It being a habit pattern formed on his previous cruise, he dropped his tailhook upon calling in marshall.

After approximately one hour of flight time, USS BOAT diverted all aircraft to a naval air station about 50 miles away. The old *Spad* pilot, seizing an opportunity to spend the night ashore, set out for NAS Beach. The Bingo field worried this *Spad* pilot a little because, besides being a strange field with 500′ hills on the downwind leg, the runway was only 4800′ long, far short of NAS Homefield's 8000′. The landing proved to be routine until the *Spad* pilot reached midfield. The forgotten tailhook was soon evident as the field arresting gear was engaged at an estimated speed of 40-50 knots. Little happened to this embarrassed *Skyraider* pilot but the consequences could have been far worse had the gear been at the approach end, or had he been a norad and the aircraft behind him landed a little fast.

The landing checklist is on the left side of the console. It can be the easiest guide to initiate a safe landing provided it is used. Even the veteran pilot can and does forget an item or two on a memorized checklist. The next pilot might not be so lucky as this old *Spad* driver.

Cigarettes May Be Hazardous To Your Health

A recent incident concerning the AFCS in the S-2E model occurred in this command.

On a daylight ASW hop off the USS BOAT, Anymouse was conducting MAD sweeps in the van of the replenishment formation at the usual 100′. After rolling out of one of the many left turns during the four-hour hop, the yoke practically jerked out of his hands and tried to return to the left turn position. "Controls jammed, this bird is down, best return to the farm," were the old pro's comments.

Double-checking the AFCS in "standby," one more turn (same type) was made and sure enough the same thing occurred. The observant right seat occupant (co-pilot) said, (with all deference to the senior aviator aboard) "The @#$%¢& pack of cigarettes in your right ankle pocket keeps moving the AFCS switch, and every time you hit it the aircraft jerks." Big sigh of relief from old pro and immediate removal of cigarette pack from right ankle pocket, with a pledge to swear off smoking.

This incident was checked by other pilots and it can be accomplished by anyone regardless of size, provided the right ankle pocket is filled with anything (SEEK kits, box lunches, wallets, *Playboy* and cigarettes of course) with the right leg resting against the console.

Two solutions are available in eliminating this problem. (1) Don't fill the right ankle pocket of the flight suit with any bulging objects, or, (2) installation of a channel guard on the AFCS standby switch.

(Try this incident on a Navy Standard black night.)

Use Your Flight Gear

In the course of an annual flight physical a few days ago, I was speaking with a former Navy jet pilot turned chopper jockey. He had considerable experience in Vietnam in helicopters, and had learned from experience to use all his safety equipment and hardware in a proper manner. An aircraft "midair" occurred recently where the proper use of this equipment probably saved his life. Another victim of this accident was not so fortunate, and was severely injured due in part, perhaps, to his not utilizing all the safety equipment normally required.

Accidents can occur at any time, and invariably when least expected. On occasion I have noticed a somewhat lax attitude toward the use of hardware and safety devices among flight personnel and have wondered why these particular people feel they are so blessed as to not have to conform to good safety standards. While none of these are gross errors, even the slightest laxity, such as not wearing flight gloves, may have serious consequences under adverse conditions.

Do you always use *your* flight gear properly? It is designed for your protection, but will avail you naught if left behind.

—Flight Surgeon
Safety Council, NAS Seattle

Reader QUESTIONS Headmouse ANSWERS

Have you a question? Send it to Headmouse, U. S. Naval Aviation Safety Center, Norfolk, Virginia 23511. He'll do his best to get you and other readers the answer.

Electronics Hazards Due to Fatigue

Dear Headmouse:

Much has been written about fatigue as it affects pilots, aircrewmen and flight deck personnel in their ability to think and act in various situations. But it is difficult to find similar material pertaining to maintenance personnel.

How many times have you read in accident reports "It is felt that fatigue was definitely a contributing factor to this accident, as the subject had been at his station for the previous 16 hours without rest. . . ?"

There is a need for frequent overtime to meet unusual situations but in this day of prolonged personnel shortages, with no decrease in operations, a point of diminishing return is often reached.

I am particularly interested in the electronic work areas where men are exposed to extremely high voltages at the test benches over long periods of time.

Would appreciate any information or source of information on this subject in order not to schedule overtime past the break-even point.

LT O. L. GILCHRIST
USNAF, FPO N. Y.

▶ Fielding a pat answer to this one is about as difficult as making an unassisted triple play in major league ball. But, here goes:

The Center has no special information concerning the degradation of performance due to fatigue which would increase the hazard to personnel involved in electronic/electric work. In general the problem of fatigue in the U. S. Navy has been treated as an operational factor and its effect has been weighed against diminished production and increasing hazard. Although studies have been made, nothing meaningful has come of them.

Perhaps the greatest single step made in determining realistic manpower needs is the implementation of the 3-M System. One of its aims is to acquire quantitative data so that firm MO factors can be established with corresponding effective manpower management. Where the manpower is to come from after MO factors are determined will depend on factors determined by other than the military. While it is expected that some improved manpower management will result, let's not kid ourselves into thinking a panacea for the military is in the offing.

Our best advice is to go MO/CO route. If your managers can't move it through the proper manpower management channels, it won't move. Meanwhile do the best you can.

To do your best and to minimize the possibility of injury due to fatigue, proper training of personnel is essential. References which are most helpful are the Training Manuals for the respective ratings; Chapter 15 of NavSo P-2455, Electricity and Electronics, and Chapter 10 of AFM 127-101, Safety Precautions for Using Electrical Facilities and Electronic Equipment. Recommended reading related to getting the most out of the people you have is "Improving the MA Factor," page 40 of the July 67 issue.

Very resp'y,

Headmouse

Unlike the flight control systems on present day high performance aircraft—the Naval Aviation Safety Center desires a continued feedback.

Has information in any Safety Center publication ever helped you to prevent an accident, avert an injury, or deal with an emergency in a better way?

If so, and you have not already informed the Safety Center, it is particularly desired and important that you do so. Such feedback is vital to all departments at the Center and for fiscal support of our safety research and education program.

P-2 Transport Flight

Dear Headmouse:

NATOPS, where are you?

Six men were ordered to report to a P-2 aircraft for return transportation after completion of a TAD school. Two of the men were not flight-indoctrinated in other-than-transport aircraft. Upon arrival at the aircraft it was found that no provision had been made for personal flight equip-

ment (i.e., flight suits, gloves, helmets and ICS equipment). The flight ensued with no major complications throughout the long, cold night, and after approximately 10 hours, the uncomfortable passengers, in their now dirty uniforms, were deposited at their home stations.

Good fortune had smiled on this apathetic crew, but it is doubtful that the accident investigation board would smile if this "NATOPS-less" flight had turned into a situation where "play it by ear" would not have worked. If it is necessary to transport personnel in other-than-VR aircraft, flight safety and emergency procedures must be explained and all required aviation personal equipment will be available to and utilized by passengers.

ADRC J. L. ANGELEY
NAS LOS ALAMITOS, CALIF.

▶ NATOPS (OpNav Instruction 3710.7D) states since patrol aircraft occasionally perform the function of transport aircraft, the requirements for certain miscellaneous safety and survival equipment (protective helmet, gloves, fire retardant flight suits, etc.) are waived for passengers when flights are made with such a purpose code in noncombat zones. On the subject of survival procedures, the P-2 NATOPS states, "Passengers shall be responsible for knowledge of ditching and bailout procedures, additional duties may be assigned by the PPC, commensurate with training, experience and background. . . . The flight crew plane captain shall brief passengers on the proper use of survival equipment and shall assign them to ditching stations."

Very resp'y,

Headmouse

Pen Gun Line Knots

Dear Headmouse:

We believe a discrepancy exists in the assembly of the Mk-79 Mod O signal flare kits. The loss of either one of the components (the gun or the flares) would render the kit useless as a signaling device. The knots tied in the string connecting the gun to the flares are considered insufficient and would probably come undone in a survival situation.

It is recommended that the manufacturer tie the units in a more satisfactory method on future production. It is also recommended that this problem be pointed out to commands already having the kits in their possession. The retieing of the knots in a bowline should preclude any loss of either of the parts.

PRI J. R. KELLY
FIGHTER SQUADRON 103

▶ Each individual squadron carries this a little differently. All should insure the ties are strong knots to preclude loss of kit components.

Very resp'y,

Headmouse

Stokes Litter

Dear Headmouse,

I have a problem at the present time trying to devise a way to attach and what to attach to a Stokes litter for flotation purposes. I would like to know if there is any prescribed flotation device for the litter or if there isn't what some squadrons use if this information is available. We tried old kapok horse collars but they do not have enough buoyancy to float the litter satisfactorily.

PR2 R. T. PERKINS
NAVY MINE DEFENSE LABORATORY
PANAMA CITY, FLORIDA

▶ The only information we have at the present time is that a rigid Stokes-type litter constructed of plastic with a flotation capability is currently being developed. According to a description in the 6 Jan 67 issue of the *Navy Medical News Letter*, it will increase the safety of patients, especially at sea when being transferred between ships. The plastic litter, as designed, should be as durable as its metal counterparts and extremely resistant to corrosive environments. The litter is being developed by the Army Medical Research and Development Command on the basis of specifications and requirements supplied by the Bureau of Medicine and Surgery. It has been contracted commercially. When a prototype is available it is to be field tested and evaluated at the Navy Medical Field Research Laboratory at Camp LeJeune, N. C.

Very resp'y,

Headmouse

Mk-2 Life Vest

Dear Headmouse:

I am writing from on board a CVS in WestPac. Recently our pilots and crewmembers in the HS, VS and some VAW squadrons have gotten the idea that the Mk-2 life vest is no longer suitable. (I would like to hear the comments of the many, many people whose lives have been saved by this nonsuitable piece of gear!) I have heard many reasons, such as insufficient buoyancy, poor attitude when partially inflated, and discomfort to the wearer. We are using Mk-3C, Mk-2 and Air Force LPU type life preservers. I have not read any official directives authorizing the use of life preservers other than the Mk-2 for these type aircraft.

If the Mk-2 is not suitable, I feel that it should be replaced, but I think this decision should not be made by local personnel. The possibilities of escaping from a ditched S-2 or E-1 aircraft with an accidentally or prematurely inflated Mk-3C are very slim. Please comment.

RIGGERMOUSE II

▶ The Mk-2 life vest is still a good piece of gear. Pilots and aircrewmen should be careful not to overload it with extra equipment and should inflate the third bladder orally for maximum buoyancy.

The Mk-2 life vest is the only one authorized for HS and VS and some VAW aircraft unless the squadrons have an official waiver. It is expected that the Mk-6 will eventually replace the Mk-2 and Mk-3C. Work on this is progressing as rapidly as possible.

Very resp'y,

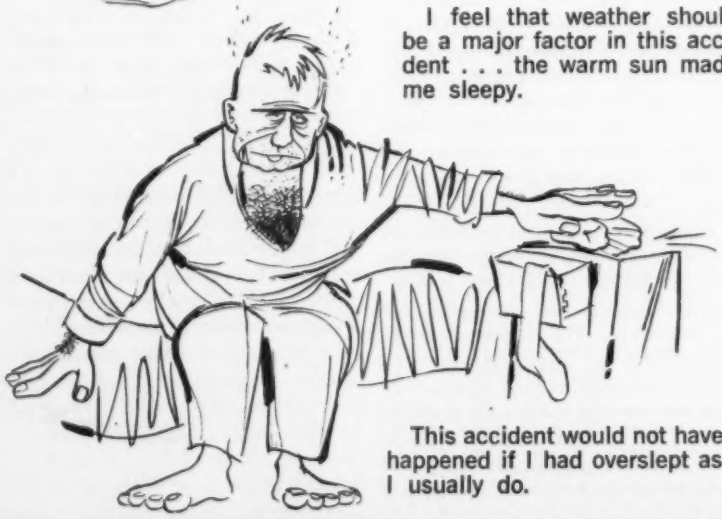
Headmouse

PILOT '?' STATEMENT QUOTES

I admit that this accident was due to pilot error . . . but there was nothing wrong with my judgment or technique.

The only material failure which occurred was me.

I feel that weather should be a major factor in this accident . . . the warm sun made me sleepy.



This accident would not have happened if I had overslept as I usually do.

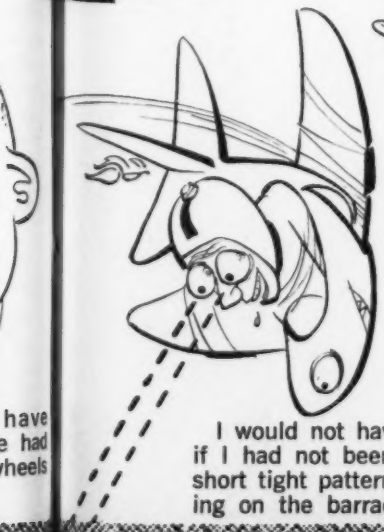
This accident could have been avoided if someone had reminded me to put the wheels down.

An essential part of each AAR is the pilot's statement, if available. He must make a statement concerning the cause of the accident and how it might have been avoided. Whenever Safety Officers gather around the milk bar some of these gems always find their way into the conversation. Here are some of the best we have ever heard and a few go back many years. While we cannot vouch for the veracity of them all, some at least we know are true.

I consider the primary cause of my accident to be supervisory error . . . my wife kept me up nearly all night.

This accident could have been avoided if my date last night had not been so obstreperous.

The primary cause of this accident is Administrative. I should have never been graduated from flight school.



I would not have had this accident if I had not been led into making a short tight pattern by Waves sunbathing on the barracks roof.

Several months ago, APPROACH *presented an article stressing the importance of exercise in relationship to physical fitness ("High Performance Flyers for Modern Aircraft," April 1967 issue). Physical fitness also depends on good eating habits and maintenance of ideal body weight. CAPT Jerome A. Moore, MC has long been interested in weight reduction and good nutrition as a part of preventive medicine. His weight reduction program which he describes here could be adapted to fit the requirements of any ship or station.*

Be a Weight Watcher!

By CAPT Jerome A. Moore, MC

All calorie charts courtesy
Metropolitan Life Insurance Co.

Be a weight-watcher for a longer, healthier and more active life.

This is good advice for all. In addition, for the naval aviator and aircrewman, the resulting improved physical condition can mean improved efficiency and performance in training and combat and, should it become necessary, improved chances in a survival situation.

Advances in the science of nutrition indicate the importance of proper foods in maintaining good health. Faulty eating habits can lead to obesity, shortened life expectancy, and conditions such as heart disease, hypertension and diabetes. Poor eating habits can also lead to the degenerative diseases formerly considered incident to old age; insurance statistics now show that these diseases occur more frequently among persons who are overweight. Since overweight indicates improper eating habits, certain of which appear to be the culprits behind the above conditions, re-education in keeping with new principles of nutrition is good preventive medicine.

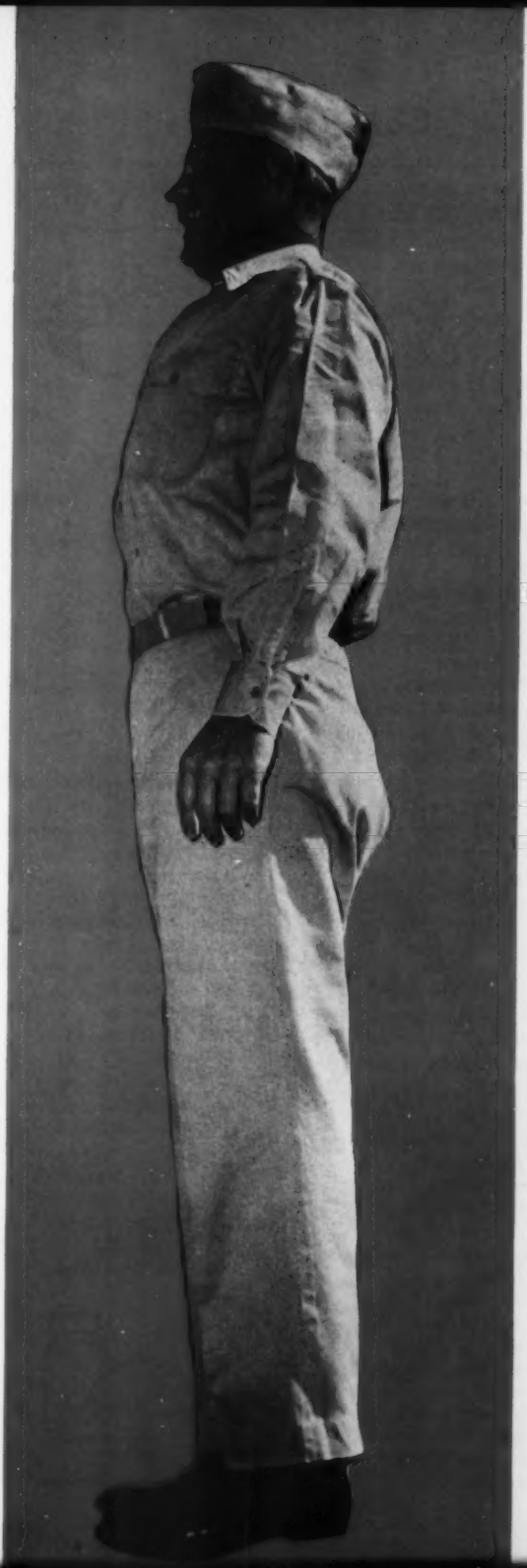
Help Required

Most persons require help in controlling their weight. Since overweight is a symptom pointing to a faulty diet, nutritional education is basic to a weight reduction program. In 1955 the author instituted such a program at NAS Cecil Field, subsequently establishing similar clinics aboard SARATOGA, NAS Jacksonville, Naval Station Rota (Spain) and currently MCAS Beaufort, S. C. (Incidentally, one of the most important steps is that the director, himself, control his own weight. The author was no exception and promptly became the first subject. Some three months later and 25 pounds lighter, he was in a position to speak authoritatively in encouraging others to do likewise.)

Although the clinics are aimed at aviators and aircrewmen, their wives are welcome to participate because of their position in food planning and preparation. Military personnel not joining the program are thus helped. When people realize that someone is interested in helping them, they come willingly and the program becomes exceedingly active with as many as 150 new persons a month.

Initial Briefing

To conserve time and to allow for an adequate briefing period for all new participants, one hour each week is set aside for indoctrination. Newcomers at these periods number from 10 to 30. This initial briefing has been found to be the most important phase leading to the success of this program. Not only does the director stress the need for weight control but also the need for a change in nutritional



Calorie Tables

1 cup equals 8 fluid ounces. 3 teaspoons (tsp.) equal 1 tablespoon (tbs.). 4 tablespoons (tbs.) equal ¼ cup.

Food and Measures	Approximate Calories
A	
Almonds..*12-15*	100
Apple butter..*1 tbs.*	40
Apples	
baked..*1 lg. and 2 tbs. sugar*	200
fresh..*1 large*	100
Applesauce, sweetened *½ cup.*	100
Apricots	
canned in syrup..*3 lg. halves and 2 tbs. juice*	100
dried..*10 sm. halves*	100
Asparagus	
fresh or canned..*5 stalks 5 ins. long*	15
Avocado..*½ pear 3½ x 3¼ ins.*	185
B	
Bacon..*2-3 long slices, cooked*	100
Bacon fat..*1 tbs.*	100
Banana..*1 med., 6 ins. long*	90
Beans	
canned with pork *½ cup*	175
dried..*½ cup, cooked*	135
lima, fresh or canned *½ cup*	100
snap, fresh or canned *½ cup*	25
Beef (cooked)	
corned..*1 slice 4 by 1½ by 1 ins.*	100
dried..*2 ozs.*	100
hamburger..*1 patty (3 ozs.)*	300
round, lean..*1 med. slice (2 ozs.)*	125
sirloin, lean..*1 av. slice (3 ozs.)*	250
tongue..*2 ozs.*	125
Beet greens..*½ cup, cooked*	30
Beets, fresh or canned *2 beets 2 ins. in diam.*	50
Biscuit, baking powder *2 ins. in diam.*	100
Blackberries, fresh *1 cup*	100
Blueberries, fresh *1 cup*	90
Bologna..*1 slice 2 ins. by ½ in. thick*	100
Breads	
Boston brown..*1 slice 3 ins. in diam. ¾ in. thick*	90
corn (1-egg) *1-2 in. square*	120
cracked wheat *1 slice, av.*	80
dark rye..*1 slice ½ in. thick*	70
light rye..*1 slice ½ in. thick*	75
white, enriched *1 slice, av.*	75
white, enriched *1 slice, thin*	55
whole wheat, 60% *1 slice, av.*	70
whole wheat, 100% *1 slice, av.*	75
Broccoli..*3 stalks 5½ ins. long*	100
Brownies..*1 piece 2 by 2 by ¾ ins.*	140
Brussels sprouts *6 sprouts 1½ ins. in diam.*	50
Butter..*1 tbs.*	95
C	
Cabbage, cooked..*½ cup*	40
raw..*1 cup*	25

habits from a preventive medicine point of view. Using insurance statistics as the basis for concern, he points out how nutritional knowledge, good judgment and frequent weighing can enable one to achieve and maintain an ideal weight. At the same time, new and beneficial patterns in eating habits are permanently established.

Our system of actual weight reduction begun at Cecil Field encompassed the careful selection of food for satisfaction in a 1200-calorie regime. Subjects, cautioned on minimum daily protein requirements, are advised to cut down on fats and carbohydrates. A reducing kit which includes mimeographed lists classifying most of the common foods into groups goes to all newcomers. The lists give calorie values for normal servings as well as protein content. Menu suggestions and reviews of new books on nutrition and low fat cooking are included.

1200-Calorie Daily Diet*

Breakfast

Fresh fruit or juice	1 serving—½ cup
Egg—cooked without fat	1
or	
Cereal	1 small serving
Bread	1 slice
Butter or margarine	1 level teaspoon
Skim milk	1 glass—6 ounces
Clear coffee or tea	

Dinner

Lean meat, fish, or poultry	4 ounces (cooked)
Vegetables (raw or cooked)	½ cup cooked raw, freely
Potato or bread	1 small potato or 1 slice of bread
Butter or margarine	1 level teaspoon
Skim milk	1 glass—6 ounces
Fruit (raw, cooked or canned without sugar)	1 serving—½ cup

Lunch or Supper

Cottage cheese or lean meat	½ cup of cheese or 2 ounces of meat
Vegetables (raw or cooked)	½ cup cooked raw, freely
Skim milk	1 glass—6 ounces
Fruit (raw, cooked or canned without sugar)	1 serving—½ cup

*Approximate

A record on each person begins at his initial visit. The record includes identification, height, weight, blood pressure, ideal weight, medication, pertinent remarks, and a questionnaire to be filled in by the subject. A great deal of the success of the program depends on weekly visits. Frequent encouragement at weekly intervals has kept many a person on the program who might otherwise have become discouraged at his slow, although steady progress.

When a subject reaches his weight goal, he is interviewed. At this time emphasis is placed on maintenance of his ideal weight and the reasons for the desirability of doing so. He is urged to weigh daily, for only in this way can a person determine his own particular continuing caloric requirements. Experience has shown that without daily weighing many persons revert to their former eating habits and soon insidiously regain 10 to 15 pounds. Hence,

Packed Lunch
For 1200-calorie daily diet*

Breakfast	*Packed Lunch*	*Dinner*
½ cup fruit 1 egg or cereal 1 slice toast 1 teaspoon butter or margarine 1 glass skim milk Clear coffee or tea	Sandwich: 2 thin slices bread 1 teaspoon mayonnaise 2 oz. lean meat, fish or poultry Wedge of raw cabbage Whole raw carrot Fresh fruit 1 glass skim milk	4 oz. meat, fish or poultry ½ cup cooked vegetable raw vegetables, freely 1 glass skim milk ½ cup fruit—fresh, cooked or canned without sugar
½ cup fruit 1 egg or cereal 1 slice toast 1 teaspoon butter or margarine 1 glass skim milk Clear coffee or tea	Sandwich: 2 thin slices bread 2 oz. lean meat, fish or poultry 1 teaspoon mayonnaise lettuce 2 stalks celery 1 small cucumber Fresh fruit 1 glass skim milk	4 oz. meat, fish or poultry ½ cup cooked vegetable raw vegetables, freely 1 glass skim milk ½ cup fruit—fresh, cooked or canned without sugar
½ cup fruit 1 egg or cereal 1 slice toast 1 teaspoon butter 1 glass skim milk Clear coffee or tea	Sandwich: 2 thin slices bread 2 oz. chicken or meat chopped and mixed with 1 tablespoon chopped celery and a little chopped onion Large fresh tomato ½ green pepper Fruit 1 glass skim milk	4 oz. meat, fish or poultry ½ cup cooked vegetable raw vegetables, freely 1 glass skim milk ½ cup fruit—fresh, cooked or canned without sugar

*Approximate

Food and Measures	Approximate Calories
Cake	
angel..*1/10 of a lg. cake*	155
chocolate or vanilla, no icing..*1 piece 2 by 2 by 2 ins.*	200
chocolate or vanilla, with icing..*1 piece 2 by 1½ by 2 ins.*	200
cupcake with chocolate icing..*1 medium*	250
Cantaloupe..*½ of a 5½-in. melon*	50
Carrots..*1 carrot 4 ins. long*	25
Cashew nuts..*4-5*	100
Cauliflower..*¼ of a hd. 4½ ins. in diam.*	25
Caviar..*1 tbs.*	25
Celery..*2 stalks*	15
Cheese	
American cheddar *1 cube 1⅛ ins. square or 3 tbs. grated*	110
cottage..*5 tbs.*	100
cream..*2 tbs.*	100
Cherries, sweet..*15 lg.*	75
Chicken	
broiled..*½ med. broiler*	270
roast..*1 slice 4 by 2½ by ¼ ins.*	100
Chinese cabbage *1 cup raw*	20
Chocolate	
milk, sweetened..*1 oz.*	140
fudge..*1 piece 1 in. sq. by ¾ in. thick*	100
malted milk..*fountain size*	460
mints..*1 mint 1½ ins. in diam.*	100
milk with almonds, sweetened..*1 oz.*	150
syrup..*¼ cup*	200
unsweetened *1 square*	160
Cider, sweet..*1 cup*	100
Clams..*6 round*	100
Cocoa, half milk, half water..*1 cup*	150
Coconut..*½ cup, fresh*	175
Cod-liver oil..*1 tbs.*	100
Cod steak..*1 piece 3½ by 2 by 1 in.*	100
Cola soft drinks *6-oz. bottle*	75
Collards..*½ cup, cooked*	50
Cooking fats, vegetable *1 tbs.*	100
Corn..*½ cup*	70
Corn syrup..*1 tbs.*	75
Corn flakes..*1 cup*	80
Corn meal..*1 tbs., uncooked*	35
Cornstarch pudding *½ cup*	200
Crackers	
graham..*1 square*	35
peanut butter-cheese sandwich..*1 cracker*	45
round snack-type *1 cracker 2 ins. in diam.*	15
rye wafers..*1 wafer*	25
saltines..*1 cracker 2 ins. sq.*	15
Cranberry sauce..*¼ cup*	100
Cream	
light..*2 tbs.*	65
heavy..*2 tbs.*	120
whipped..*3 tbs.*	100
Cream-puff shells..*1 shell*	85
Cucumber..*½ medium*	10
Custard, boiled or baked *½ cup*	130
D	
Dates..*4*	100
E	
Egg..*1 medium size*	75
Eggplant..*3 slices 4 ins. in diam. ½ in. thick, raw*	50
Endive..*average serving*	10
Escarole..*average serving*	10
F	
Figs, dried..*3 small*	100
Flour, white or whole grain *1 tbs., unsifted*	35
Frankfurter..*1 sausage*	125

Food and Measures	Approximate Calories
G	
Gelatin, fruit flavored, dry	
3 oz. pkg.	330
ready to serve . . *½ cup*	85
Ginger ale . . *1 cup*	85
Gingerbread, hot water	
2 by 2 by 2 ins.	200
Grapefruit . . *½ medium*	50
Grapefruit juice, unsweetened . . *1 cup*	100
Grape juice . . *½ cup*	80
Grape nuts . . *¼ cup*	100
Grapes	
American or Tokay *1 bunch—22, av.*	75
seedless . . *1 bunch—30, av.*	75
Griddle cakes	
1 cake 4 ins. in diam.	75
H	
Halibut . . *1 piece*	
3 by 1⅜ by 1 ins.	100
Ham, lean . . *1 slice*	
4¼ by 4 by ½ ins.	265
Hard sauce . . *1 tbs.*	100
Hickory nuts . . *12-15*	100
Hominy grits	
¾ cup, cooked	100
Honey . . *1 tbs.*	100
I	
Ice cream . . *½ cup*	200
Ice cream soda *fountain size*	325
J	
Jellies and jams *1 rounded tbs.*	100
K	
Kale . . *½ cup, cooked*	50
L	
Lamb, roast . . *1 slice 3½ by 4½ by ⅛ ins.*	100
Lard . . *1 tbs.*	100

Food and Measures	Approximate Calories
Lemon juice . . *1 tbs.*	5
Lettuce . . *2 lg. leaves*	5
Liver . . *1 slice*	
3 by 3 by ½ ins.	100
Liverwurst . . *2 ozs.*	130
Lobster meat . . *1 cup*	150
M	
Macaroni . . *¾ cup, cooked*	100
Maple syrup . . *1 tbs.*	70
Margarine . . *1 tbs.*	100
Marshmallows . . *1*	20
Milk	
buttermilk (fat-free) *1 cup*	85
condensed . . *1½ tbs.*	100
evaporated . . *½ cup (1 cup diluted)*	160
instant non-fat dry *6 tbs.*	80
skim milk, fresh *1 cup*	85
whole milk . . *1 cup*	170
yogurt, plain *1 cup*	120-160
Mints, cream . . *½-in. cube*	5
Molasses . . *1 tbs.*	70
Muffins	
bran . . *1 medium*	90
1-egg . . *1 medium*	130
Mushrooms . . *10 large*	10
Mustard greens *½ cup, cooked*	30
N	
Noodles . . *¾ cup, cooked*	75
O	
Oatmeal . . *¾ cup, cooked*	110
Oil—corn, cottonseed, olive, peanut, safflower *1 tbs.*	100
Okra . . *10-15 pods*	50
Olives	
green . . *6 medium*	50
ripe . . *4-5 medium*	50
Onions . . *3-4 medium*	100
Orange . . *1 medium*	80
juice . . *1 cup*	125
Oysters . . *5 medium*	100
P	
Parsnips . . *1 parsnip* *7 ins. long*	100

discouragement and procrastination lead them back to obesity and dangerous eating habits.

Another device found to be deterrent to such a reversion to former eating habits and overweight is the photograph. In "before and after" photographs, the change in appearance, both in physical and personality aspects, which is so gradual during the course of the program, is most impressive. Subjects who have achieved their goal never tire of expressing pleasure with themselves and gratitude for the assistance given them.

BOQ Mess Manager Helps

Cooperation of food service personnel at Cecil Field was especially helpful in aiding pilots in the program who ate at the BOQ. The mess manager took an active part. Menu changes reduced calories and excess fats from the meals. At the salad bar, the variety and appearance of items were improved. Large size bowls resulted in self-service of generous portions which in turn, decreased the desire for fatty entrees and desserts. With the installation of a self-service cooler for skim milk, adjacent to that for whole milk, the volume of skim milk consumed increased daily. Instead of ice cream with the usual 12 to 14 percent butterfat, ice milk with less than 4 percent was substituted with no complaints.

Lectures were given to the cooks and mess stewards to emphasize their importance as contributors to aviation safety. Instructed in the harmful effects of hard fats, they were advised to eliminate these ingredients in gravies and sauces and the use of natural vegetable oil was recommended where fats seem necessary. Overweight cooks and stewards were also invited to join the weight control program.

17,000 Pounds Shed

By the end of a 26-month period, in the Cecil Field program, some 1400 persons had lost more than 17,000 pounds of excess weight. The overall average weight loss for those who reached their ideal level was 23 pounds.

The universal drop in blood pressure was the most significant observation made in the entire program. As would be expected, any symptoms referrable to hypertension disappeared promptly. (Blood pressure elevations frequently returned with regained weight.) *Particularly interesting was the finding that 25 percent of the pilots in this program noted increased G tolerance.*

Observations and results of similar clinics at various bases mentioned above during the past 12 years indicate a general awareness and increasing concern over the medical significance of overweight with an eagerness to join an organized program voluntarily. For example, current statistics at MCAS,

An attractive salad bar by a cooperative mess is appreciated.

Beaufort record a loss of 42,000 lbs by 2830 persons over a period of 38 months.

Efficiency Improves

Squadron commanders commented on increased efficiency in their units where many of their personnel had attained their ideal weights and had established better eating habits. A compilation of observations made by the subjects themselves runs in a similar vein. Typical comments follow:

Pilot: "I am more agile and able to move around better at work and in sports . . . I experience a more exhilarating feeling in everything I do and feel more energetic . . . I have noticed a 2 G increase in G tolerance . . . I feel mentally alert and physically stronger . . . Again, I seem to be more alert and quick on reactions."

Squadron Commander: "I have been worried about blood pressure and hypertension for two or three rounds of annual physicals. Losing weight followed by normal blood pressure readings several times contributed to a more relaxed attitude towards everything."

The flight surgeon, the pilot and the air crewman can benefit from such a program as described above. The flight surgeon may find in it an opportunity to enhance his rapport with squadron members. The pilot and air crewman benefit through improved health, efficiency and appearance. All can take great satisfaction in their joint contribution to the physical fitness and to progress in aviation.

Continued

Food and Measures	Approximate Calories
Peaches	
canned in syrup	
2 lg. halves and 3 tbs. juice	100
dried . . *4 medium halves*	100
fresh . . *1 medium*	50
Peanut butter . . *1 tbs.*	100
Peanuts, shelled . . *10*	50
Pears	
canned in syrup	
3 halves and 3 tbs. juice	100
fresh . . *1 medium*	50
Peas	
canned . . *½ cup*	65
fresh, shelled . . *¾ cup*	100
Pecans . . *6*	100
Pepper, green . . *1 medium*	20
Pickles, cucumber	
sour and dill . . *10 slices 2 ins. in diam.*	10
sweet . . *1 small*	10
Pies . . (sectors from 9-in pies) apple	
3-in. sector	200
lemon meringue	
3-in. sector	300
mincemeat	
3-in. sector	300
pumpkin . . *3-in. sector*	250
Pineapple	
canned, unsweetened	
1 slice ½-in. thick and 1 tbs. juice	50
fresh . . *1 slice ¾-in. thick*	50
juice, unsweetened	
1 cup	135
Plums	
canned . . *2 med. and 1 tbs. juice*	75
fresh . . *2 medium*	50
Popcorn, plain . . *1½ cups, popped*	100
Popovers . . *1 popover*	100
Pork chop, lean	
1 medium	200
Potato chips . . *8-10 large*	100
Potato salad with	
mayonnaise . . *½ cup*	200
Potatoes	
mashed . . *½ cup*	100
sweet . . *½ medium*	100
white . . *1 medium*	100

Food and Measures	Approximate Calories

Prune juice..*½ cup*	100
Prunes, dried..*4 medium*	100
Pumpkin..*½ cup*	50
R	
Radishes..*5*	10
Raisins..*¼ cup*	90
Raspberries, fresh..*1 cup*	90
Rhubarb, stewed and sweetened..*½ cup*	100
Rice..*¾ cup, cooked*	100
Roll, Parker House *1 medium*	100
Rutabagas..*½ cup*	30
S	
Salad dressing	
boiled..*1 tbs.*	25
French..*1 tbs.*	90
mayonnaise..*1 tbs.*	100
Salmon, canned..*½ cup*	100
Sardines, drained..*5 fish 3 ins. long*	100
Sauerkraut..*½ cup*	15
Sherbet..*½ cup*	120
Soup, condensed..*11-oz. can*	
mushroom	360
noodle	290
tomato	230
vegetable	200
Spaghetti..*¾ cup, cooked*	100
Spinach..*½ cup, cooked*	20
Squash	
summer..*½ cup, cooked*	20
winter..*½ cup, cooked*	50
Strawberries, fresh..*1 cup*	90
Sugar	
brown..*1 tbs.*	50
granulated..*1 tbs.*	50
powdered..*1 tbs.*	40

Food and Measures	Approximate Calories
Sweetbreads, calves' *1 pair med.-sized*	200
Swiss chard *½ cup leaves and stems*	30
T	
Tangerines..*1 medium*	60
Tapioca, uncooked..*1 tbs.*	50
Tomato juice..*1 cup*	60
Tomatoes, canned..*½ cup*	25
fresh..*1 medium*	30
Tuna fish, canned *¼ cup, drained*	100
Turkey, lean..*1 slice 4 by 2½ by ¼ ins.*	100
Turnip..*1 turnip 1¾ ins. in diam.*	25
Turnip greens..*½ cup, cooked*	30
V	
Veal, roast..*1 slice 3 by 3¾ by ½ ins.*	120
W	
Waffles..*1 waffle 6 ins. in diam.*	250
Walnuts..*8*	100
Watermelon..*1 round slice 6 ins. in diam. 1½ ins. thick, no rind*	190
Wheat	
flakes..*¾ cup*	100
germ..*1 tbs.*	25
shredded..*1 biscuit*	100

* * *

Alcoholic beverages	
beer..*8 ozs.*	120
gin..*1½ ozs.*	120
rum..*1½ ozs.*	150
whiskey..*1½ ozs.*	150
Wines	
champagne..*4 ozs.*	120
port..*1 oz.*	50
sherry..*1 oz.*	40
table, red or white *4 ozs.*	95

Want to Lose Weight?

In order to shed your excess pounds, you must limit your daily intake to 1200 calories. With the aid of menu suggestions and calorie lists, you will soon learn that careful selection will result in satiety as well as steady weight loss.

Fatty foods or solid fats should be avoided not only because they are loaded with calories but because it is contended they can lead to hardening of the arteries and coronary heart disease according to recent studies. In eliminating these fatty foods, here are a few suggestions:

- Stop using cream.
- Substitute skim for whole milk and ice milk for ice cream.
- Use butter sparingly. (Better yet, use soft margarines requiring refrigeration.)
- Use cheeses made from skim milk such as cottage cheese, sap sago cheese, and certain imported Greek and Scandinavian cheeses.
- Eliminate all fat meats.
- Skim fat off stock before making gravy or soup.
- Use egg yolk sparingly. (Not over three a week is recommended by many cardiologists.)
- Substitute liquid vegetable oils when possible for solid fats.

You can expect to lose 10 to 15 pounds during the first two weeks and an average of 1½ pounds per week thereafter. One more hint: if you eat your meals *slowly*, you will be content with smaller portions and will not require seconds. Satiety is delayed, making its appearance 20-30 minutes after onset of the meal. A rapid eater could work in 2 to 3 helpings by this time.

A requisite of this program is that you report in each week at which time your weight and blood pressure will be recorded. At this time any individual problems can be discussed with the doctor who will follow your progress carefully.

You can easily maintain your ideal level once it is reached. At this point now, daily weighing is in order. It will tell you if you are exceeding your daily food requirement, allowing you to adjust your menu as necessary.

PENCIL FLARE GUN

During a recent weekly aircraft inspection a cartridge from a pencil flare gun kit (Signal Kit Illumination Mk-79 Mod 0) was found lying on the deck of a passageway. The owner, when located, stated that the cartridge had fallen out of the bandoleer on his survival vest some time back. He had picked it up and put it loose in one of the side pockets of his hard hat bag. It was out of this hard hat bag that the cartridge was eventually lost.

Fortunately, the cartridge was discovered before it rolled into some recess within the aircraft where it probably would not have been discovered until detonation or fire. The results might even have caused a loss of the aircraft and the lives of the pilot and crew.

Though the pencil flare kit is light and compact, the pencil flare gun and cartridges should be treated with the same respect with which you would treat a gun. An improperly or carelessly handled pencil flare cartridge can be deadly. One need only take a look at the cartridge base to see the vulnerable detonating cap. Anyone who does not keep close account of his cartridges or who carries them so that the detonating caps are unprotected is inviting trouble. If in doubt about the safety and positioning of your flare kit, see your rigger.

—LCDR RON BALLARD
ASO, VAW-121

The new SV-2 survival vest *(Clothing and Survival Equipment Change 26)* provides space for carrying the Mk 79 Mod 0 pencil flare kit. Velcro fastens the flap protecting the flare gun and cartridges (open for purposes of this photograph).

notes from your flight surgeon

When the wearer of these boots ejected from an uncontrollable F-11A below 6000' there was no time for him to position himself and put his feet in the stirrups. His steel-toed flying boots protected him from serious foot injury when he struck the instrument panel during ejection.

Habit Can Kill

IN a period of a few months, two men have been fatally injured by E-1B propellers. In the first case, the victim was walking backward while taxiing another aircraft and backed into the prop. The most recent incident involved a man from one of the E-1B detachments. In this case the man left the vicinity of the aircraft for a few minutes. When he left, only the starboard engine was turning. In his absence the port engine was started and when he returned to the aircraft, he walked around the nose right into the port prop.

In both of these accidents *habit* was the fatal ingredient. Both of these men were killed because they respected the lethal power of the prop only when it was turning. After all, everyone knows a prop can't hurt you when it isn't turning. But therein lies the fallacy; a bad habit is formed and in a moment of stress or fatigue or haste or just plain forgetfulness, habit puts you into a prop that *is* turning and the result is a tragic, needless loss of life.

How can you avoid becoming a statistic? It is really very simple: *make a habit of never walking through a prop arc.* On those occasions where it is absolutely necessary to get into the prop arc, do so with a feeling of apprehension as though the prop were going to start turning without warning. Don't hurry your preflight but spend as little time as possible in the prop arc and be

completely aware of the prop at all times.

Psychologically, it is very difficult to form two habit patterns for what is basically one circumstance. You can't treat the prop as safe one minute and dangerous the next, because sooner or later, for reasons already mentioned, you could confuse the two habit patterns and the safe act becomes the fatal act.

—AEWW-11 Aviation Safety Officer

Locator

THE reflections from the high visibility orange and white reflective tape on my hard hat were the primary signal device by which the destroyer located me. Observers remarked that they thought I had set a light beacon in the water.

—Rescued Pilot

Takes Impact

EXCERPT from Incident Report: Of particular significance is this pilot's habit of flying with his visor down. When the wind screen was hit by a small arms round, the pilot's visor was forced up by wind blast. It did, however, take the initial impact of flying gunsight glass and wind screen plexiglass as evidenced by numerous pits. The pilot suffered only minor cuts around his eyes and on his forehead. Use of the visor and the need for having it locked down are being reemphasized to pilots in the local area.

—Squadron CO

Recent Crash Call

THE crash phone jangles and we scramble to the ambulance seconds later at the base of the tower. The radio chirps, "Ambulance proceed to the edge of the duty runway. It looks like we'll need you on this one." The only information—the pilot of an F-8 is complaining of dizziness and visual difficulty. An arrested landing is made. Before we are allowed on the runway, the ordnance is rendered safe and the crewmen pin the seat. Hurriedly, we climb the port side of the aircraft. The pilot takes a moment from his vomiting to explain, "Ear block, both of them."

A short time later in the dispensary, the examination reveals red throat, nasal congestion and fluid behind both ear drums. The pilot comments, "Boy, was I scared up there. Couldn't focus, vertigo, nausea—the works. My wingman sure did a great job—called me right to the deck—real calm voice." He asks, "How come I still feel dizzy and nauseated when I move my head?"

Question: "Had a cold?"

Answer: "Yeah. A little one never caused any trouble though."

—LT T. L. Clark, MC NAS Key West

Ear Blocks

THE INCIDENCE of common colds in naval aviation will go up in the next few months and, if we aren't careful, so will the number of ear and sinus blocks. Stuffy and swollen nasal linings don't let air through those tiny holes to properly equalize pressure differentials, remember?

You can fly with a cold and get away with it a few times, but sooner or later it's going to catch up with you. Maybe it'll be on a night GCA, in the rain, when you get sudden blinding pain over one eye or cheek, possibly followed closely by pain and decreased hearing in one ear, and the other earphone has been cutting in and out with static all night. Wouldn't you be better off, after all, at home in front of the TV with a nice hot drink and some cold pills?

We still can't cure a common cold but we can advise you to stay on the ground. All you lose is a day or two of flying (when you didn't feel like it anyhow) as opposed to a month or two following an ear and/or sinus infection.

—VT-4 Safety Sense

Hits Overhead

DURING a night TransPac flight at FL220, a P-3A entered a thunderstorm/squall line which had not been included in the weather brief. Lightning flashes gave a few seconds' warning of imminent turbulence and the crew was directed to lash down any loose gear. St Elmo's fire was intense. It looked like "milk running over the windshield," the pilot said.

Before the gear could be secured, the aircraft entered moderate to severe turbulence. The crewmembers were strapped in their seats with the exception of the two men securing gear. One of them was thrown upward, hitting his head on the overhead. *Possible serious injury was prevented because he was wearing his hard hat.*

The aircraft was out of turbulence shortly thereafter and routine flight continued.

Hearing Damage

SIX cases of nerve-loss deafness attributable to noise damage were diagnosed at sick call in a single cruise, a carrier's safety council reports. These persons will never have complete hearing again. The council proposes two solutions: 1) strict enforcement of regulations on wearing individual ear protectors and 2) insurance that supplies of Mickey Mouse noise suppressors are adequate.

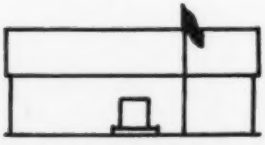
Power Plant Troubleshooting

Here are guidelines and checklists to help you help Mr. Troubleshooter solve unexplainable abnormal power plant behavior

PILOTS & AIRCREWS

MAINTENANCE

TYPE COMMANDER



NAVAIRSYSCOMHQ

NAVAVNSAFECEN

Unexplained power plant flameout, RPM hangup, stall, slow acceleration, surge, power loss, chug, failure to relight, autodeceleration or autoacceleration are among those situations which call for as much information as can be provided before effective troubleshooting can proceed.

This review of General Power Plant Bulletin 9 of Jan 1967 outlines a preliminary investigating procedure to help determine the need for special investigating teams to analyze the conditions leading to engine operational abnormalities such as those just mentioned, the cause or causes for which are not immediately apparent.

Since the type of engine dictates the number of different subsystems and their relationships, this list of actions will not all be applicable in every case. The sequence of checks will also vary but a logical sequence should be used in order to isolate the problem area to a specific subsystem.

The bulletin is not intended to conflict with or supersede existing MIMs where specific trouble-shooting procedures may be specified.

Preliminary Information

(*Leave all systems as-is*)

- Pilot and flight crew debriefing (immediately following occurrence.)
- Did all engine gages respond normally during lightoff, runup, flight line check, and takeoff? if not, provide details.
- Time from takeoff to occurrence, and brief description of flight.
- Details concerning the following before, during, and after the occurrence, as applicable.
  - Weather conditions
  - Ambient air temperature
  - Altitude
  - Aircraft attitude, maneuvers
  - Airspeed
  - Power lever position, movements
  - Unusual noises
  - Unusual vibration
  - Surges
  - Rate of thrust or power decay
  - Anti-icing—ON or OFF
  - Synchrophaser—ON or OFF
  - Mixture position
- Values for the following, or statement that data is unknown or not observed during or immediately after the occurrence:
  - Fuel flow
  - Turbine-in or Turbine-out temperature (EGT)
  - EPR, HP, RPM
  - Oil Pressure
  - Torquemeter reading
  - MAP
  - Were any of these values fluctuating? If so, rate of fluctuation (frequency)
  - Carb air temperature
  - Pilot's opinion of what these values should have been, and the amount of variation

• Was aircraft boost pump warning light ON at any time?

• Was aircraft fuel transfer system operating normally? What quantity in feed tank?

• Was chip detector light ON at any time?

• Was fuel control transferred from PRIMARY to MANUAL? What was the effect?

• If RPM dropped off, did EGT or TIT increase or decrease?

• If engine flamed out and relight was obtained, describe procedure followed. Was relight normal? If not, describe.

Wingman's Debriefing

• Were there any indications of aircraft's problems in flight? Cite any pertinent transmissions.

• Provide details of occurrence including any indications of vapor, smoke or flames from aircraft.

Maintenance Officer's Report

• Any yellow sheet discrepancies on airplane or engine during last 30 days?

• Was appropriate corrective action taken on above, and checked?

• Engine Serial Number, time since overhaul, number of overhauls, date and place of last overhaul, and total time on engine. Time since last periodic inspection.

• List maintenance actions on engine, control, propeller, and accessories for the past 30 days, and note any changes made, or discrepancies corrected. Include information on pertinent Changes/Bulletin incorporated.

• Vendor, Part No. and Stock No. of accessories which may be involved. Dates and places of last overhauls.

• Visual examination of aircraft and engine: Check the following as applicable:

- All filters for contamination, including water.
  - ✔ Fuel Control
  - ✔ Fuel Pump
  - ✔ P&D Valve
  - ✔ Aircraft fuel system
  - ✔ Others
- Fuel level in tanks
- All connections to control
  - ✔ P_b connections
  - ✔ P_{t2} connections
  - ✔ T_{T_2} sensor
- P_b moisture trap
- Power lever, throttle, propeller control rigging.
- Ignition system
- Fuel and oil leaks
- Oil level in tank
- Oil strainers
- Engine inlet and exhaust for damage
- IGV position, linkages
- Exhaust nozzle position
- Aircraft boost pump operable
- Check aircraft engine instrumentation connections.

Note: If no discrepancies are found during the foregoing static checks, and if the engine had not suffered overspeed, overtemperature, FOD, or other damage requiring engine change, motor it over with the starter to check for rubs, vibration, rundown time and any unusual conditions. If all systems are apparently in order the next step will be to start the engine and try to duplicate the reported symptoms on the ground. Observe all instruments, and determine whether engine responds in a normal manner. Perform the following:

- Functional Check

If response is not normal or if gage readings deviate from normal during only runup phase, secure the engine to avoid damage. It is advisable to contact the engine manufacturer's Field Service Representative to obtain assistance in the dynamic troubleshooting procedure, if practicable.

Troubleshooting-in-depth may require Field Service Rep assistance.

• Start the engine and bring it up to IDLE.

• Check all engine parameters for normal operation.

• Conduct vibration check.

• Determine engine control and propeller governor settings as applicable.

- Record values for the following:
  - ✔ Aircraft boost pressure
  - ✔ Fuel pump discharge pressure

- ✓ Primary manifold pressure
- ✓ Secondary manifold pressure

• Check the following for normal operation
- ✓ Engine and aircraft bleed system
- ✓ Fuel Heater Air
- ✓ Aircraft electrical system, constant speed drive; and generator

• Accelerate slowly to maximum permissible power, monitoring all instruments.

• If engine functions normally, perform and time several snap accelerations and decelerations.

• Transfer to MANUAL.

• If transfer is normal, accelerate slowly to maximum permissible power, taking precautions as indicated previously.

• Exercise engine in MANUAL to assure satisfactory response. Avoid overtemperature.

• Attempt to confirm, or duplicate, the reported discrepancy by operating engine in range where problem occurred.

• Perform a complete engine trim check. Do not change adjustments. Include jetcal check of EGT indicating system.

• Note and record any and all discrepancies or deviations from normal readings and operating conditions. If an internal failure in the engine or in a component such as a control has occurred, in all probability it will be evident from the facts accumulated to this point. If the problem area is thus isolated, standard maintenance procedures should be followed thereafter. If no problem area isolation is possible, technical assistance from the Naval Air Systems Command shall be requested by most rapid communication means practicable at the time. The aircraft power plant officer of the Naval Air Force Atlantic or Pacific Fleet will have the current name, code, and telephone number of the proper contact at the NavAirSysComHq, who will recommend to the Type Commander one of the following actions at this point:

• Refly the airplane and try to duplicate the condition while carefully observing instrumentation.

• Add more extensive test instrumentation and conduct additional ground tests.

• Change the engine and/or control (provided the airframe systems have been eliminated as problem areas). Hold the removed engine and/or control for shipment to an activity where a more detailed analysis can be made.

• Impound the airplane and engine as-is until a team of specialists can be organized and sent to the scene.

Selection of any of these above or alternate courses of action will depend upon the circumstances, i.e., the seriousness of the reported condition, the operational commitments, location of aircraft, spare engine and control availability, etc., accordingly, additional detailed guidance cannot be specified herein. The basic philosophy is to obtain the facts and organize them so that the trouble can be isolated and corrected. The need for a team of specialists will be dictated by the amount of background knowledge available on a particular engine-airplane combination, the skill levels available locally for troubleshooting and analysis, the permissible down-time, the location and availability of test instrumentation, the type of discrepancy, safety aspects, etc. In any event, the engine project engineer at the NavAirSysCom will act as monitor and will provide detailed recommendations as to further action.

Required Reports

Brief speedletter reports shall be submitted to NavAirSysCom with copy to NavAvnSafeCen and Type Commander explaining the abnormal or unusual operating condition, the action taken, and the ultimate cause of the discrepancy. These reports will be used to facilitate future troubleshooting, up-date inspection procedures, provide information for use in the engine component improvement programs, and as a basis for future specification requirements.

Log Entry

An entry shall be made in the Engine Log of the date and the fact that inspection in accordance with this Power Plant Bulletin was required.

The log entry shall be made in the Aeronautical Equipment Service Record NavWeps Form 13090/3, Miscellaneous Section 13090/21 Part VIII. Include a short statement of the problem encountered and the corrective action taken. See sample, below.

MISCELLANEOUS

PART VIII
(When used in Aeronautical Equipment Service Record)
(Formerly NAVAER 418A)

AIRCRAFT MODEL OR EQUIPMENT NAME	EQUIPMENT MODEL/TYPE	BUNO OR SERIAL NO
Engine, Gas Turbine	J52-P-6A	123456

DATE	REMARKS
8/16/67	Engine experienced intermittent flameouts during ground operation. Normal maintenance procedures failed to isolate cause of flameouts. Aircraft impounded in accordance with General Power Plant Bulletin 9. Investigating team discovered piece of lockwire lodged in fuel control pressure regulating valve. Fuel control replaced. Aircraft returned to operational status.
	J. C. Malm Maintenance Control Officer

NOTES

and comments on maintenance

Searchlight Fire

FIRE, which developed during a *Stoof* night illumination flight, burned a hole in the top of the searchlight housing (see photo below).

Three normal illumination runs of about 30 seconds arc burning time were completed. Between each engagement, there was a cooling period of at least seven seconds. When the beam light was triggered for a fourth run, there was no immediate illumination. Three seconds later, however, it did light up normally. Upon being secured, the copilot noticed that a small fire seemed to be developing on top of the light's dome. Immediately, all circuit breakers were pulled securing all electrical power to the wings.

No time was lost in returning to base where investigation revealed two causes of the fire: (1) The positive carbon drive was improperly adjusted thereby driving the carbon positive rod too fast, and (2) The arc current regulator was set at 150 amps vice the maximum allowable of 125 amps. The conditions caused an excessively high tail flame. A further check revealed that the searchlight components had not been checked since the aircraft had been received from PAR earlier in the month.

Charred searchlight dome resulting from high tail flame.

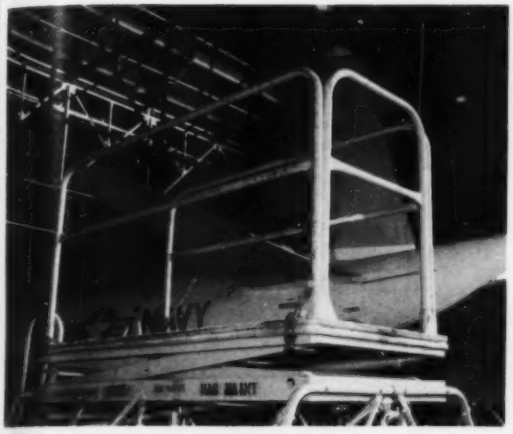
As a result of this maintenance oversight, the squadron has instituted a tolerance inspection of all searchlight components before each flight as follows:

- A template will be used to check proper positioning of the searchlight probes.
- Measurement of current values at surge and in stabilized condition.
- Checking the drive mechanism for proper operation, arcing the searchlight and observing the tail flame.

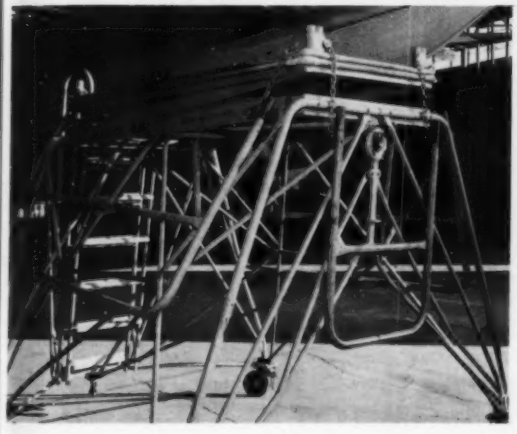
Workstands, Guard Rails and People

The ability to put all three together in the same place to get a job done safely is no mean trick. The maintenance man with a tool box in hand and a job to do usually takes the most direct route to the task. If the job requires the use of a workstand, he will probably use the closest one available. The trip across the hangar deck to the guard rail storage area may be just far enough away, require too many trips and take enough time to discourage the user from putting forth the total effort required.

If two of the three (workstand and guard rails) were always together, then the arrival of the third ingredient would complete the assembly without the extra trip to search for the usually missing guard rails. This squadron has attached the workstand guard rails to the workstands with links of chain. The length of chain is sufficient to allow the rails to be in the upright position or stored flat against the side of the workstand. This fix has produced amazing results. Maintenance personnel now



Chains fixed to workstand guard rails guarantee availability. Rails rigged (above), stowed (below).



utilize the guard rails as they were designed, thus decreasing the chance for personal injury. The fix can be done on the squadron level or by AMD during periodic check.

—Contributed by LCDR C. M. Bradbury ASO, VP-16

Watch the Levers

Prior to washing an A-1H, the plane captain wanted to close the canopy. Consequently, he was building up hydraulic pressure by actuating the electric pump. Unfortunately, another crewman had left the dive brake control handle in the open position. The brake had not extended because of zero hydraulic pressure. Now, however, the pressure was building up so the brake extended with such force that it bent its trailing edge on the concrete. The brake is not designed to be opened when the aircraft is on the ground because it is too long when in the open position.

Crunched dive brake—the control handle—*OPEN*.

Here is another incident where ground check rules and sequences were not observed.

Secure That Tow Bar Properly

T-34 nosewheel rigged on tow trailer using new locking bar. Inset: Comparison of new and old locking bar.

A T-34B was being respotted from the line to the hangar. Enroute, the mainmounts rolled over a gas hose bridge causing a pitching movement which compressed the nose wheel oleo. This allowed the retaining chain, from the tow trailer to the locking bar (attached to the aircraft's nose wheel) to slacken. The locking bar rotated, unlocked, and separated from the nose wheel as the oleo expanded. The nose wheel then rotated to starboard and fell off the tow trailer's swivel-well. On contacting the ground, the nose wheel jammed past the 20-degree limiting bar bolt. This necessitated replacement of the nose wheel strut.

Towing mishaps are common occurrences and seem to be caused by inattention plus an infinitely different set of catalystic happenstances. Ground crews must expect the unexpected.

Jump-Seat View

As the newly overhauled aircraft taxied to the flight line, I thought to myself, "I surely am glad to be getting rid of that old bird of ours. There won't be very many problems on this new plane."

The freshly painted C-1A came to a stop, the engines were shut down, and the pilots got out.

After the pilot had signed the yellow sheet, I took the book and, noting there weren't any gripes on this hop, thumbed back through the other "B" sections.

I noted that before going into PAR there had been a gripe written up on the fuel quantity indicators. A 55-lb differential existed between the two tanks. It was signed off when the system was calibrated. The plane had been downed also for the starboard fire warning light during the rollout. The takeoff was aborted.

On an earlier "B" sheet the plane had been downed for an overspeeding engine on takeoff. The port tach generator was changed and it was signed off. There was a notation just under the sign-off stating that there wasn't an actual overspeed but an erroneous reading given by the bad tach generator. It had checked good on turnup and on the following hop.

Further examination showed that there were 9 hours on the port engine and 17 on the starboard. Both engines had been generously painted with the new aluminum paint for corrosion control and there weren't any oil leaks to speak of on either engine.

On the acceptance inspection the only discrepancies I found were a bolt installed backwards in the mixture control rod at the bellcrank on the engine, the port oil cooler had a small amount of oil showing around one of the tubes, and the idle RPM and mixture were out of adjustment.

By ADR2 Dan H. Evans
USS F. D. ROOSEVELT

Here's a story that happens far too often-- But this time as seen by a pilot's best friend, the competent aircrewman. . .

After the acceptance inspection had been completed the aircraft was scheduled to fly to Pensacola and pick up the crew that had flown our old C-1A there for PAR. A thorough preflight was given the plane, the engines were started and operationally checked. All of the instrument readings were perfect.

A normal takeoff was made and we climbed out to 5000′ for an uneventful hop to Pensacola. (We thought.)

I had taken up my station between the pilot and copilot right after takeoff to monitor all the engine instruments. After 15 minutes of flight I noticed there was a 150-lb fuel quantity differential. There wasn't a headset in the plane for the crewmember so I reached forward and placed my finger on the gage to let the pilot know of the difference. Both tanks had been reading nearly the same before takeoff. I immediately checked the starboard engine nacelle for any leaks since it was the low side on the fuel gage. I couldn't see any leakage. I asked the pilot if he wanted me to crossfeed the port engine to the starboard fuel cell and the starboard engine to the port fuel cell in order to eliminate the engines as the source of trouble.

He decided to wait a few minutes to see what, if anything, developed. After a second inspection of both engine nacelles, I returned to my station having satisfied myself that we weren't losing fuel overboard.

Thirty minutes later the fuel quantity was still split when the copilot said the power failure warning light, located in the lower right-hand instrument panel, kept flickering on and off—meaning our main inverter was going off the line.

The pilot asked me for an inflight emergency handbook so he could determine which instruments we'd lose when the inverter failed. Our complete nav bag had gone with the old C-1A and there was only a partial nav bag in the C-1A we were flying. So I had to give him a NATOPS manual which was a lot bigger and bulkier.

According to the manual we'd lose all the engine instruments except the CHT. However, the needles on the oil pressure and fuel pressure gages would stay at the last pressure they had registered. Therefore the true pressure would not be shown on the gages.

I asked the pilot if he wanted me to select the standby inverter. He said, "Let's wait to see if the main inverter is actually failing."

A few minutes later the pilot was checking the instrument panels when he pressed the test switch for the fire warning system and the starboard light failed to burn. The bulbs were switched and still it wouldn't come on. However, the bulb we took out of it burned in the port fire warning light. Both lights had burned prior to takeoff.

It was about an hour after takeoff and everything was running as smoothly as possible under the circumstances. There was still a 100-lb differential, no fire warning light for the starboard engine, and the main inverter warning light coming on every few minutes. Just as I thought everything was going to settle down the fuel pressure on No. 1 engine started to slowly fall towards zero. The adrenalin went to full power.

Without a headset I had to point at the gage as I had done with the fuel quantity gage earlier.

The pilot was shocked just for an instant to see that fuel pressure diving to zero. I had had more time to get over the initial shock than the pilot did, so I lunged forward and flipped on the boost pumps. I expected the pressure to come right back up. I thought at first the shaft had sheared on the engine-driven pump; however, that pressure kept right on falling. I checked the fuel selectors to make sure one of them hadn't vibrated shut. I then raced my hand across the circuit breaker panel to see if the CB for the boost pump had popped. All the CBs were still in.

I saw the pilot stiffen as he realized we were about to lose No. 1 engine. I was expecting the engine to start backfiring at any second. The RPM and MAP

were still married up and steady; and after what seemed like an eternity I realized the engine wasn't going to stop.

Then I saw the copilot pointing to the brightly glowing red light in his lower right-hand instrument panel. The one that means you've lost your main inverter and all the engine instruments!

The standby inverter was selected and the fuel pressure came back up to 22 psi. What a relief! The whole thing was even a little funny then. Ten seconds earlier I'd been scared silly.

We figured the fuel press gage was in need of a good throwing away since it didn't stay at its last pressure when the inverter failed.

Upon landing at our destination a fuel truck was sent for and the plane was fueled, oiled, and postflighted. The fuel quantity was still split 100 lbs by the gage but when I fueled it there was only a two-gallon difference in the amount taken by each tank. The AEs had some work in store for them. I did too but I didn't know it at the time.

On the postflight I noticed engine oil dripping from the bottom of the starboard engine nacelle and wheel well doors. The oil cooler was responsible for the mess. Upon oiling the engines I found they each took less than one gallon apiece. So there wasn't as much oil on the starboard nacelle as it looked. The wind and propwash had just spread it over a large area.

After completing the postflight I cleaned the nacelle and by that time our pilot was returning with the pilots and crew of our old C-1A. The same pilot and copilot manned the controls. I was grateful because the pilot was a very good one and I had a great deal of confidence in him particularly in an emergency situation.

After everyone was strapped in we taxied to the end of the duty runway and the engines were checked for pressures and a mag drop. Even the fire warning lights worked on both engines. I told the pilot about the oil cooler leaking a little and the amount of fuel it had taken in each tank and also the amount of oil it had taken. It was decided to fly back with the main inverter as it was, rather than be overnight drawing one from supply and installing it. The inverter, as it was, could be switched back on after allowing it to cool off for a few minutes so that our exact heading could be determined.

The engine runup at the end of the runway was uneventful and the plane was brought into position for takeoff.

The pilot asked the copilot if he wanted to make the takeoff. It had been quite awhile since the copilot had flown a recip since he was an F-4 pilot. So the copilot said he would like to make the takeoff for the practice.

There were eight people in the plane plus all the additional gear from the old C-1A and a full fuel load. I now had a headset so I wouldn't have to point or shout to be heard by the pilots and we also had a complete nav bag.

The copilot took control of the plane and advanced the throttles to 30″, released the brakes and pushed the throttles to FULL power. The nose rose as the power was added and we started our takeoff. I was watching all the gages and just as we passed 2000′ I thought I saw a needle move on the tachometer. I centered my attention on it, as my mind went back to the previous gripe on the port engine overspeeding. Just as the wheels left the runway, No. 1 went to 2950 rpm!

While engine operation in excess of takeoff RPM is considered abnormal, General Power Plant Bulletin 10 of 14 April 1967 raises the RPM limits. For the R1820-82: Allowed RPM 2900-3000; Inspection Required 3000-3200; Remove Engine 3200. —Ed.

I pressed the mike button and said, "Slight overspeed on No. 1."

The copilot, a little rusty on recips, seemed to hesitate just for an instant and by that time the pilot had his hands on the throttles and had pulled No. 1 off the line to about 2500 rpm. The plane swerved to the left just a little, but the copilot quickly corrected this and our climbout was continued without any further incidents.

No problems arose on the return trip. The starboard fire warning light still would not burn when the test switch was pressed and the fuel pressure split 150 lbs almost immediately after takeoff, as before.

An uneventful landing was made back at NAS and the plane was downed for maintenance! The main inverter had to be changed, the fire warning transmitters were found to be bad, the starboard oil cooler had to be replaced, and the port prop governor was changed. The idle RPM and idle mixture had to be set again too.

For a plane that wasn't supposed to have very much wrong with it, this one certainly had had its share in one day—not to mention shaking me up a few times. In retrospect, that overspeed could have developed into a real problem because of our load but we were just lucky that time.

MURPHY'S LAW*

A-6 Canopy Cyl Goof

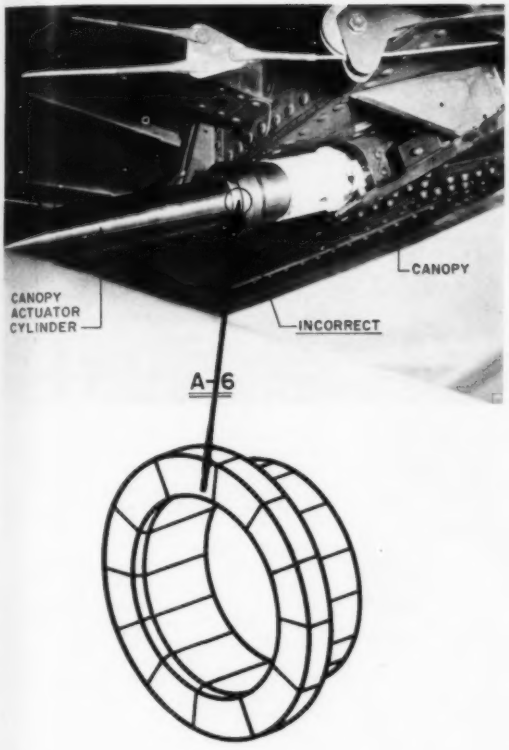


Fig. 1 PN 128HM10171-1

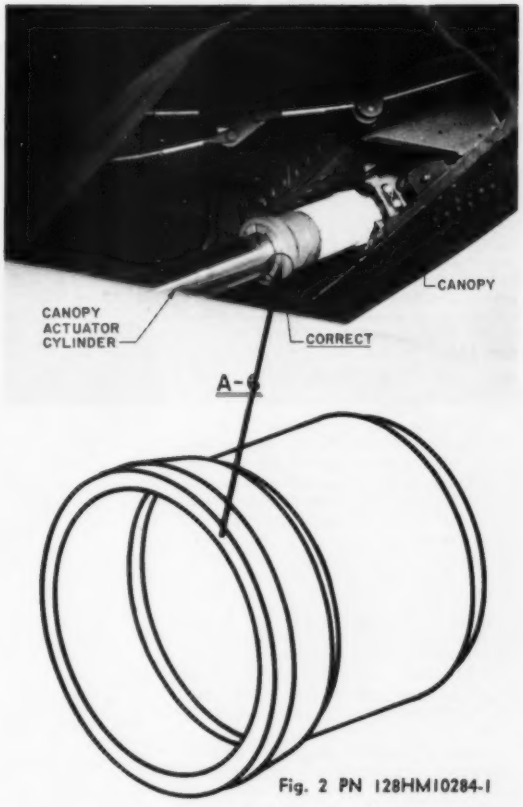


Fig. 2 PN 128HM10284-1

DURING an early morning preflight the pilot found an escape system item that just didn't look right. The locking segments on the rear of the canopy actuator appeared to be installed *backwards*. An AME and a check of a nearby A-6 confirmed his suspicions.

The canopy actuator had been repacked over the weekend and upon reinstallation of the canopy locking segments, PN 128M10171 in Figure 1 were installed backwards. With this arrangement locking retainer, PN 128HM10284 shown figure 2 will not slide over the canopy lock segments during the jettison cycle, thereby preventing canopy jettison. The aircraft had been flown three times after the misinstallation.

Although the actuator is not a preflight item on the NATOPS checklist it is on the AME's daily inspection and the plane captain's postflight.

It was recommended that this item be included on the NATOPS Pilot Preflight Checklist and that procedures be established for the mandatory use of the MIM when tasks are performed on emergency systems.

—Contributed by LT H. G. Sprouse, ASO, VAH-123

*** If an aircraft part can be installed incorrectly, someone will install it that way!**

Wisdom is knowing when to speak your mind and when to mind your speech.

—The Kansas City (Mo.) Packer

Letters

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request.

Address: APPROACH Editor, U. S. Naval Aviation Safety Center, NAS Norfolk, Va. 23511. Views expressed are those of the writers and do not imply endorsement by the U. S. Naval Aviation Safety Center.

Air Starting Hose Safety Note

FPO New York—When starting aircraft, oftentimes the hose from the deck start unit or tractor is attached in a twisted condition. This twist sometimes results in a blowout and at other times causes a surge of air to the starter probe shearing the coupling or damaging the motor.

The most dangerous result of a blown hose at the aircraft end is the whipping action of the hose and possibly the fitting. Other damaging effects include a wet start from the delay of ample starting air to the engine and possibly damage to the alternator drive shaft (A-4C).

A simple remedy to these potential hazards is the painting of a fluorescent stripe or stripes along the length of the hose. This will give an easy, quick indication if the hose is twisted in any way.

ADJ3 D. R. SMITH
VA-36

• Simple and effective. Thank you, ADJ Smith.

Stoof Troubleshooting Tip

FPO New York—When an S-2E returned from an early morning flight with low torque pressure gripe (300 psi vice 352 psi at 2800 rpm and 56.5" MAP) it was determined that the No. 1 cylinder was not firing.

Troubleshooting revealed that the low tension harness plug was broken loose from the high tension coil. (See photo.) This condition was discovered upon removing the high tension coil and was not apparent because of paint covering the crack. Since the engine had been received just a week before, it is believed the part was defective when installed.

Paint hid crack in tension coil.

Hereafter high tension coils will be carefully inspected upon engine acceptance.

LTJG C. MUSITANO
VS-28

"Zero Defects" Program

Washington, D. C.—The theme of the Navy's dynamic motivational program is "do it right the first time." Called "Zero Defects," the program is aimed at making military and civilian personnel aware of the fact that you don't have to make mistakes in order to be certified as being human. Eighty or ninety percent right may be O.K. for the classroom but has no place in an aircraft maintenance department or in a supply depot, any more than riding with a pilot who is capable of making a safe landing even 99 percent of the time.

In April of this year, the Navy conducted two one-day management training seminars. Attending the one-day seminars were top-level military and civilian personnel from key Naval activities. The purpose of the seminars was to brief the 120 persons in attendance on the success the program was having in industry and the other military services where it was tried and proven, and to impress upon them the program's need for continual top-level support in order to be successful.

The 300 persons who attended the three-day workshops held on both the East and West Coasts from May through July were given a concentrated indoctrination on methods for planning, conducting, and sustaining a Zero Defects program. Personnel attending these workshops represented selected shore-based Naval and Marine Corps activities in the Continental U.S. as well as activities in Guam, the Philippines, and Japan.

Zero Defects is not intended to eliminate or be a substitute for other programs in the Navy but will be a means to encourage getting the job done right the first time and to recognize a job that is "well done."

F. CURHAN
NAVAIRSYSCOMHQ

7102 Safety Tool, Use of

FPO San Francisco—In Marine aviation we have numerous special tools and if a person works in or around aircraft maintenance, we will frequently hear an officer or NCO remonstrate with some mechanic for not using a tool properly or for not using the proper tool for the job being accomplished. The 7102 is a safety tool that is available to all Marine Air Groups but, in many instances, it is not being utilized to gain the maximum safety that this special tool can provide. 7102 is a military occupational

specialty number assigned to a Marine officer whose title is flight equipment officer. The *M.O.S. Manual* gives a thumbnail description of this MOS in its descriptive summary: "supervises and coordinates flight equipment activities."

There is certainly no shortage of well-qualified 7102s due to the many highly qualified non-commissioned officers who have been commissioned as second lieutenants and warrant officers. However, even though all Air Groups have 7102s assigned, there are Air Groups that do not have this officer working as a flight equipment officer, or he will have numerous collateral duties which require far too much of his time for him to be really effective as a flight equipment officer. You can find 7102s who have been to all the technical schools within their field and who, in addition, have years of experience in this technical MOS who are currently working as mess, embarkation, post exchange, industrial relations and special services officers, to mention just a few of the various jobs they are assigned instead of the one they are technically trained to do. Each Air Group should have a 7102 assigned as group flight equipment officer and, to get proper utilization of this officer, his collateral duties should be kept to a minimum, and, if possible, related to his primary duty.

Although working directly under the supervision of the group maintenance officer, he should have the firm and enthusiastic support of the Group commanding officer insofar as his frequent inspections of *all* group aircraft and squadron flight equipment and safety and survival shops are concerned. It is also beneficial to have a Group order authorizing the Group flight equipment officer to conduct inspections of any and all Group aircraft (not to interfere with flight operations), flight equipment and safety and survival shops at any time he desires. He should make these inspections frequently, (once or twice a week) and to all squadrons within the Air Group. His inspections should be informal and informative in nature and squadron personnel attached to the squadron being inspected should accompany him on all inspections of their squadron aircraft. In his inspection of aircraft escape systems, maintenance being performed on this equipment, and pilot's personal flight and survival equipment, he should be extremely critical.

The very nature of the flight equipment field requires that the best possible maintenance on equipment be performed by personnel who are conscientious, attentive to the job at hand and well qualified in their respective military occupations. There is no margin for error in the maintenance of this equipment because an error or oversight in maintenance could deprive an airman of his last chance for survival.

Check sheets for type aircraft should be used for these inspections and they should include information on all the latest modifications and directives. Only discrepancies that involve safety of flight should be brought to the attention of squadron maintenance officers. Minor discrepancies should be noted and corrected by squadron personnel as soon as practicable. Squadron records and shop procedures should be constantly checked by the Group flight equipment officer to see that they are adequate and accurate and he should also see that all squadrons adhere to strict quality control procedures.

To assure that the very best maintenance is being performed, there is no substitute for constant supervision and inspections. An Air Group that utilizes its flight equipment officer properly will find that even very minor discrepancies on aircraft escape systems, oxygen breathing systems, personal flight and survival equipment will be few and far between. The 7102 is probably one of the best life insurance policies a pilot or aircrewman could have. Wouldn't it be better to have him working full time in his MOS and congratulating you on a successful mission rather than taking him from a collateral duty or job out of his MOS, to help investigate the probable causes of a malfunction that may have cost a pilot his life?

CWO H. E. GORE, USMC
FLIGHT EQUIPMENT OFFICER
1ST MAW

• You have obviously given this subject a great deal of consideration. Thank you for sending us your thoughts.

Leadership Words of Wisdom

NAS Corpus Christi—For what it is worth, I would like to personally endorse the article "Improving the MA Factor" by CDR D. M. Layton in the July issue.

In my estimation this commander has considerably more insight than the average.

His ideas, put into practice, could go a long way toward solving personnel problems, not just in the Navy, but in all walks of life. And as you may have suspected, I am not referring to the field of maintenance, but rather, to the field of *leadership*. This is one of the most complex subjects in the world today since leadership in some form is required of everyone, except perhaps the hermit.

We would certainly benefit by his wisdom if the commander would write more articles on this subject.

ADR1 R. P. PETERSON

• CDR Layton has promised us another article or two when his busy schedule permits. Other meaty pieces he has written for APPROACH include: "System Safety Engineering Specifications," Aug 64; "Before the Fix Is On." Nov 64; "Accident Investigation," Mar 65; "The Most Unforgettable Safety Officer I've Ever Known," June 65 and "LT A. V. Safeoff Goes to a 5-day Safety School," Feb 66.

Murphy'd Murphy

With each batch of mail comes more letters telling us we goofed by transposing the photos in the July issue, p. 45 of the J-65 Murphy. Most of the writers noted a corollary to Murphy's Law as it applies to printing.

As the old story goes, when we're right, nobody remembers, but when we're wrong, they never forget.

To add to the list of respondents acknowledged in the August issue:

ADJ1 J. H. Smoyer, VX-4, Pt. Mugu
ADJ1 W. E. Laux, Service Test, Pax River
Q. C. Div., AMD NAS Los Alamitos
ADCS Z. F. Turgeon, VA-125 NAS Lemoore
AE2 R. L. Hoyle, Q. C. NAS Glenview
ADJ2 H. P. Clayton, VA-126, FPO, San Francisco
CPL J. D. Chesney, NATTC, Memphis
Mr. Damgaard, NARF, Alameda.

With the licks came some kinder words from WO1 C. E. Hughes, VC-10, Q. C. who says: "The volume of articles processed by your staff and few adverse letters attest to an admirable record. Your magazine has always been and will continue to be of inestimable value to the maintenance effort."

Thank you, Warrant Officer Hughes.

From reader response we somehow have the feeling that *everybody* reads Murphy's Law and *everybody* knows the J-65.

With fingers crossed we believe future processes in APPROACH publication should preclude additional goofs in this department.—Ed.

Vol 13 **approach** No 4

Our product is safety, our process is education and our profit is measured in the preservation of lives and equipment and increased mission readiness.

Contents

DEPARTMENTS

NavAir 00-75-510

CREDITS

Cover Painting—Underway Replenishment, by Howard Boyle courtesy The Boeing Company, Vertol Division, Morton Pa.

Page 8 photo by Art Schoen courtesy Ling-Temco-Vought Inc., Dallas, Texas

Page 16 thru 19 photos and diagram courtesy Naval Air Test Center, Patuxent River, Md.

Purposes and policies: Approach published monthly by the U. S. Naval Aviation Safety Center, distributed to naval aeronautical organizations on the basis of 1 copy per 10 persons. It presents the most accurate information currently available on the subject of aviation accident prevention. Contents should not be considered as regulations, orders or directives and may not be construed as incriminating under Art. 31, UCMJ. **Photos:** Official Navy as credited. Non-naval activities are requested to contact NavAvnSafeCen prior to reprinting APPROACH material. **Correspondence:** Contributions are welcome. The right to make editorial changes to improve the material without altering the intended meaning is reserved. Reference to commercial products does not imply Navy endorsement. Views of guest written articles are not necessarily those of NavAvnSafeCen. **Distribution:** if you are receiving the magazine free because of military or commercial contract status with the Navy . . . Requests for distribution changes should be directed to NavAvnSafeCen, NAS, Norfolk, Va. 23511. Phone: Area Code 703, 444-4271 (days), 444-3520 (Nights, weekends, Holidays) Att: Safety Education Dept., IF YOU ARE A PAID SUBSCRIBER, address all renewals and address changes to Division of Public Documents, Washington, D. C. 20402. **Subscriptions:** Single copy 35 cents; 1-year subscription $3.50; 2 yrs., $7.00; 3 yrs., $10.50; $1.00 additional annually for foreign mailing. **Printing:** Issuance of this periodical approved in accordance with Department of the Navy Publications and Printing Regulations NAVEXOS P-35. Library of Congress Catalog No. 57-60020.

Increasing Your PS

By LCDR R.C. Gentz, ASO, VS-32

If someone were to propose that a certain event had a 99 percent probability of occurring, we would normally consider that to be excellent odds. (Every pilot rolls for a drink now and then and if he's like most of us, then shortly after he bought the first few rounds he began to get a feel for probabilities.)

Suppose, for instance, that over a particular period there were 100 events which might happen to a certain pilot. Each of these in turn, would have a 99% probability of occurring safely. If it didn't, and that one out of a hundred came up, then the flight might terminate at something other than an authorized landing site. A little thought will indicate that his probability of *not* having an accident isn't very large.

Let's consider some of the items to which we could possibly assign a 99% safe completion figure.

1. Unauthorized maneuvers
2. Improper planning for weather
3. Incomplete briefing
4. Rushed preflight
5. Poor supervision
6. Lack of standardization
7. Physiological problems (lack of rest, flying with a cold, etc.)
8. Improper maintenance
9. Inattention to detail
10. Failure to learn from another's mistakes.

These are 10 items which are prime contenders in the race to cause accidents. If each of these items occurred 10 times over the period under consideration the odds would, as stated, very likely catch up with our pilot. Conversely, if he could eliminate the occurrences one by one, the odds would improve. If the pilot could be aided by some additional effort, motivation, planning or study which would raise the odds to 99.9% (or one accident in 1000) the odds would have increased in his favor 10 times with only a 0.9% increase in effort. Now the odds and his PS (probability of survival) take on a much more favorable aspect.

Thus, each time we take action which we know decreases our PS, we should take extra care because some time the Queen of Spades might come up. Conversely, each *small* effort that we make to prevent these occurrences will allow us to remain combat ready to a much greater degree. Besides, everyone knows that it doesn't hurt to be an ace saver.